State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

THE STATUS OF THE FLAT-TAILED HORNED LIZARD (*PHRYNOSOMA MCALLII*) IN CALIFORNIA

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EXECUTIVE SUMMARY

This report was prepared in response to a petition received by the Fish and Game Commission from Dr. Wilbur Mayhew and Ms. Barbara Carlson to list the flat-tailed horned lizard (*Phrynosoma mcallii*) as an endangered species.

On May 13, 1988, pursuant to Section 2074.2 of the Fish and Game Code, the Commission decided that the petition contained sufficient information to determine that the petitioned action may be warranted. Pursuant to Section 2074.6 of the Fish and Game Code, the Department undertook a review of this petition. Based on the best scientific information available on the flat-tailed horned lizard, the Department has evaluated whether, in fact, the petitioned action should be taken. Information and comments on the petitioned action and the species in question were solicited from interested parties, management agencies and the scientific community.

This report presents the results of our review and analysis.

Findings

The flat-tailed horned lizard is a small, ant-eating desert reptile which is patchily distributed in portions of Imperial, San Diego and Riverside counties. Monitoring conducted since 1979 indicates an overall decline in the abundance and habitat of this lizard. A significant portion of this species habitat was eliminated in the early 1900's by the creation of the Salton Sea, agriculture and urbanization. More recent losses in habitat can be attributed primarily to off-highway vehicle use, geothermal development, sand and gravel extraction and the construction of roads and powerlines. Recently staked out gold-mining claims may be the newest threat. Although pesticide spraying has repeatedly been suggested as a factor in this species' population decline, no data are currently available to determine whether or not this activity is a threat. Approximately 11% of this species habitat occurs in Bureau of Land Management special management areas which afford some protection to the lizard.

The flat-tailed horned lizard also occurs in extreme southwestern Arizona, where it is protected from collection. The lizard is afforded no protection in Mexico, where it occurs in northeastern Baja California Norte and northwestern Sonora. The Arizona and Mexico populations are outside the scope of this review of the petitioned action, but it should be noted that the U. S. Fish and

Wildlife Service has elevated the flat-tailed horned lizard to a Category 1 species, and will be preparing a federal listing package for it during 1989-90.

Conclusions

Although the petitioners requested that the species be listed as endangered, the Department finds that the flat-tailed horned lizard should be listed as a threatened species, according to Section 2067 of the Fish and Game Code. The Department's findings are based on the following:

1. Habitat modification and destruction has been and continues to be the primary threat to the continued survival of this species. Current and projected habitat loss and fragmentation is primarily due to off-highway vehicle activity, geothermal development, sand and gravel extraction and the construction of roads and powerlines. Gold mining may also be a problem in the future. Much of habitat for this species (44%) occurs on Bureau of Land Management lands. Given that agency's multiple use mandate and the large area its limited law enforcement staff must patrol, lizard abundance and the quality of its habitat seem likely to continue declining to the point of endangerment in the foreseeable future. Most of the remaining habitat (43%) is private land.

2. Overexploitation by curio collectors and the pet trade may have been a factor in this lizard's decline. Collection of this species is now prohibited, however, and we have no evidence to indicate that overexploitation is currently taking place. We therefore conclude that it is not a factor threatening the existence of this species.

3. Naturally-occurring predation on the flat-tailed horned lizard by other animals such as rattlesnakes and loggerhead shrikes has been documented. Because information on predation is limited to two accounts in the literature, we cannot determine at this time if naturally-occurring predation is a threat. Levels of predation may be artificially elevated, however, in lizard populations near agricultural fields, since agriculture can effectively increase the numbers of predatory birds like shrikes. Levels of predation may also be elevated near urban areas where pet or feral housecats can prey on lizards.

4. There is no evidence to suggest that competition from other animals threatens the existence of the flat-tailed horned lizard.

5. There is no evidence to suggest that disease is a threat to the existence of the flat-tailed horned lizard.

6. Pesticide spraying has been suggested as a factor in the decline of this species. Little information on the effects of pesticide use on lizards is available; therefore, we cannot determine if pesticide spraying is a threat until a scientific study which specifically address this issue has been conducted.

Recommendations

1. The Commission find that the flat-tailed horned lizard is a threatened species.

2. The Commission publish notice of its intent to amend 14 CCR 670.5 to add the flat-tailed horned lizard (*Phrynosoma mcallii*) to its list of threatened species.

3. The Department of Fish and Game establish or continue the interagency coordination and commitment necessary to minimize continued loss and deterioration of this species habitat and ensure the preservation of habitat deemed essential to maintaining the species in perpetuity.

4. The Department of Fish and Game determine where the areas of highest quality habitat and highest numbers of this species currently exist.

5. The Departments of Fish and Game and Food and Agriculture determine the effects, if any, of pesticide spraying on the FTHL and its food source.

6. The Department of Fish and Game obtain the natural history information necessary to make informed management decisions and formulate a recovery plan.

7. The Department of Fish and Game prepare a recovery plan.

8. The Department of Fish and Game work with other appropriate agencies to establish preserves of a size sufficient to maintain self-sustaining populations of this species.

THE STATUS OF THE FLAT-TAILED HORNED LIZARD (*PHRYNOSOMA MCALLII*) IN CALIFORNIA

INTRODUCTION

Petition History

On January 25, 1988, the Fish and Game Commission received a petition from Dr. Wilbur Mayhew and Ms. Barbara Carlson of the University of California at Riverside requesting State listing of the flat-tailed horned lizard (*Phrynosoma mcallii*) as an endangered species. The Department of Fish and Game (Department) reviewed the petition and recommended to the Commission that they accept the petition as provided for in the California Endangered Species Act (CESA). On May 13, 1988, the Commission accepted the Department's recommendation and designated the flat-tailed horned lizard (FTHL) as a candidate species. That action initiated a twelve month review period, as provided for in the CESA, within which the Department must provide a written report to the Commission. This Department report contains the results of the Department's review, and a recommendation to the Commission, based on the best scientific information available, whether or not the petitioned action is warranted. It also includes a preliminary identification of the habitat that may be essential to the continued existence of the species and suggests management activities and other recommendations for recovery of the species.

Department Review

During the twelve month review period, Department representatives contacted a number of affected and interested parties and invited comment on the petition during the course of the review (see Appendix A). The comments received from these reviews are addressed in the Pre-publication of Notice.

RESULTS

Life History

Description

Like other horned lizards, the FTHL has a flattened body, short tail, daggerlike head spines and cryptic coloration. Adult body length (excluding the tail) reaches a maximum of approximately 81 mm (3.2 in) (Stebbins 1985); hatchlings are about 35-38 mm (1.4-1.5 in) (Howard 1974). Ventral coloration is white, cream or silvery. Dorsal coloration is ash-gray, sandy or cream colored, depending on the substrate. This species is distinguished from other horned lizards in its range by a dark vertebral stripe;

broad, flat tail; two slender, elongate occipital spines; and the absence of external ear openings (Johnson and Spicer 1985, Stebbins 1985). A more technical description of FTHL morphology can be found in Bryant (1911), Johnson and Spicer (1985), and Funk (1981).

Taxonomy

The taxonomy of the FTHL was uncertain from the lizard's discovery in 1852 until the mid-1950's, when current evolutionary thought, modern taxonomic techniques, and a sufficient number of specimens became available. An excellent summary of the classification and nomenclature of the FTHL is provided by Johnson and Spicer (1985).

Biology

Food Habits. Although all horned lizards are primarily myrmecophagous, the FTHL feeds almost exclusively on ants, to a significantly greater degree than many of its cogeners (Pianka and Parker 1975). Pianka and Parker (1975) reported that ants comprised 97.6% of the FTHL diet. Turner et al. (1978) found 97.7% of FTHL food items to be ants, and although eleven species of ant remains were observed, four species - *Veromessor pergandei, Pogonomyrmex californicus, P. magnacanthus* and *Conomyrma insana* - made up 91% of all remains counted. Other insects such as small hymenopterans, tenebrionid beetles, weevils, membracids and "small bugs" comprised the remaining food items.

Although the FTHL can apparently survive on metabolic water (Mayhew 1965), it has been observed drinking water in captivity (Johnson and Spicer 1985).

Home Range and Population Density. Turner and Medica (1982) found the average home range size for male FTHLs to be 0.32 ha (0.79 acres) and 0.05 ha (0.12 acres) for females. The researchers felt that these were underestimates due to limitations in their data, however, and using methodology developed by Turner et al. (1969), predicted a home range of approximately 0.25 ha (0.62 acres).

Turner et al. (1978) found FTHL numbers in one study plot to be 6-8/ha (2.4 - 3.2/acre) but considered this to be exceptionally high density.

Reproduction. Sex ratio of the FTHL is approximately 1:1 (Mayhew, unpubl. field notes; Turner et al. 1978). Mating begins in April-May (Behler and King 1979), and more than one clutch of eggs may be laid in favorable years (Turner et al. 1978). Clutch size is commonly 3-7 eggs (Howard 1974, Norris 1949, Pianka and Parker 1975), but occasionally as many as 10 eggs may be laid (Stebbins 1954). Although Howard (1974) stated that young FTHLs

may breed in the spring following their first hibernation, Turner et al. (1978) suggested that females are probably not sexually mature until an age of around 21 months.

Daily Activity. In order to regulate their body temperature, horned lizards undergo a regular, daily sequence of behavior (Heath 1965). They typically emerge from the sand early in the morning, then shuttle between sun and shade (Bogert 1959, Cowles and Bogert 1944). Feeding, territorial and sexual behavior occurs during the period of alternation between sun and shade. Horned lizards burrow partially or totally into the sand during the hottest part of the day, re-emerge during late afternoon, and usually terminate daily activity by burrowing for the night (Heath 1965). The FTHL has been found out of its burrow as late as 2000 h (Klauber 1939) and 2225 h (Norris 1949), however.

Nocturnal activity has also been reported for the desert horned lizard (*P. platyrhinos*) (Harris 1958, Mays and Nickerson 1968), the round-tailed horned lizard (*P. modestum*), and the Texas horned lizard (*P. cornutum*) (Williams 1959). Nocturnal activity appears to occur when the combination of cool nights and high daytime temperature result in a warm substrate such as a road surface (Brattstrom 1965, Williams 1959), or when a disturbance such as rainfall occurs (Williams 1959).

Morning and seasonal emergence has been found to be independent of temperature, and is likely due to an endogenous or circadian rhythm (Cowles and Bogert 1944, Heath 1965, Mayhew 1965). Heath (1965) found that over 40% of the horned lizards in his study came out before sunrise, even though both air and ground temperatures were as low as 19°C (66 °F). FTHLs have been observed to be active as early as 0700 h (Norris 1949) and 0715 h (Turner et al. 1978).

Seasonal Activity. The FTHL is an obligatory hibernator, as individuals experimentally prevented from hibernating starve to death (Mayhew 1965). Mayhew (1965) suggested that hibernation is likely controlled by reduced photoperiod, and found no FTHLs active in the field after the first week in October. The FTHL generally hibernates in sandy soils at relatively shallow depths. Cowles (1941) found them hibernating at a depth of 10 cm (4 in) in the wild, while most (82%) of the FTHLs Mayhew (1965) held experimentally hibernated at a depth of 50 mm (2 in). Emergence from hibernation usually occurs in March or April, although active individuals have been collected on the surface in January (Johnson and Spicer 1985) and February (Mayhew 1965).

Associated Species. Other lizard species often observed in areas inhabited by the FTHL include the zebra-tailed lizard (*Callisaurus draconoides*), desert iguana (*Dipsosaurus dorsalis*), fringe-toed

lizards (*Uma* sp.), western whiptail (*Cnemidophorus tigris*), side-blotched lizard (*Uta stansburiana*) and desert horned lizard (Johnson and Spicer 1985, Turner et al. 1978). Hybridization between desert horned lizards and FTHLs can occur in areas where their ranges overlap (Stebbins 1985). A list of additional common species present, including amphibians, birds and mammals, can be found in Johnson and Spicer (1985).

Predators. Few records exist in the literature which specifically discuss predation on the FTHL. Funk (1965) reported that a sidewinder (*Crotalus cerastes*) ate a FTHL, and Mark Jorgensen (unpubl. data in Turner and Medica 1982) found three FTHLs impaled on a creosote bush (*Larrea divaricata*) by a loggerhead shrike (*Lanius ludovicianus*). Predators reported for other species of horned lizards include: the coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), grasshopper mouse (*Onychomys torridus*) (Munger 1986); prairie falcon (*Falco mexicanus*) (Miller 1948); Swainson's hawk (*Buteo swainsoni*) (Knowlton and Stanford 1942); roadrunner (*Geococcyx californicus*) (Bryant 1911); loggerhead shrike (Munger 1986, Pianka and Parker 1975, Turner and Medica 1982); rattlesnake (*Crotalus* sp.) (Bryant 1911, Vorhies 1948); leopard lizard (*Gambelia wislizenii*) and striped whipsnake (*Masticophis taeniatus*) (Pianka and Parker 1975).

Humans and their pets have been considered as predators of horned lizards as well. Bryant (1911) noted that "with the coming of civilization the domestic cat becomes a formidable enemy second only to the curio collector, who has practically exterminated the horned lizards in some localities". Jennings (1987) estimated that at least 115,000 San Diego horned lizards (*Phrynosoma coronatum blainvillei*) were taken from the greater Los Angeles area over a 45-year period, mostly between 1890 and 1910, during the height of the curio trade.

Susceptibility to predation is presumably reduced by the FTHL's remarkably cryptic coloration, sizeable occipital spines and tendency to remain motionless. On occasion, however, it can run or burrow into the sand quite rapidly (Norris 1949).

Parasites and Diseases. Nematodes have been found in the FTHL (Klauber 1939, Norris 1949), and red mites were reported as ectoparasites (Norris 1949). No reports of naturally occurring diseases in horned lizards were found in the literature.

Habitat Requirements

Many authors have described the FTHL as being restricted to areas of fine, windblown sand in extremely barren country. This species, however, also occupies areas covered with small pebbles or sand and gravel which are near sandy areas (Turner et al. 1980). The "best FTHL habitats generally have surface soils of finely packed sand or desert pavement overlain intermittently with loose fine sand" (Turner et al. 1980). Soil types on the Turner et al. (1978) study plots varied from loam (silty clay and gravelly silt) to sand (active dune, loamy fine and coarse, gravelly, and fine). The most characteristic perennial plant species present are creosote bush, white bursage (*Ambrosia dumosa*) and occasionally saltbush (*Atriplex* sp.). Most of the areas occupied by the FTHL generally lie at low elevations (<250 m above sea level) and are either flat or have modest slopes.

According to Turner et al. (1980), the FTHL does not occur in the following habitats which are well represented within the lizard's geographic range:

1. Rocky, mountainous areas.
2. New alluvial areas with sloping terrain. Soils are coarse, and contain relatively large particles and stones.
3. Salt flats and mud flats where vegetation is limited or absent.
4. Major dune systems. The FTHL has not been found in the main body of the Algodones Dunes.
5. Marshes, tamarisk (*Tamarix* sp.) - arrowweed (*Allenrolfia* sp.) thickets, and other areas of dense vegetation.

FTHL habitat is characterized by extensive periods of drought, little rainfall, and frequent high temperatures. Summers are hot, with average monthly maxima in the upper 30's°C (86°F) and minima in the low 20's°C (68°F). Air temperatures often exceed the summer average, however, Norris (1949) reported frequent shade air temperatures of 46°C (115°F) and typical July surface sand temperatures in excess of 55°C (130.5°F). Winters are mild, with average monthly maxima in the upper 10's°C to mid 20's°C (50-68°F) and minima around 5°C (41°F). Five to nine frost-free months occur each year (Johnson and Spicer 1985). Rain, in the years it occurs, falls in the winter and may average as little as 142 mm (5.6 in) (Norris 1949).

Distribution and Abundance

Historical

Distribution. Exact historical distribution of the FTHL in California is not known. Old distribution records are very limited, and accompanying locality information is often

ambiguous. The historic range of this species, however, is probably similar to the generalized map presented in Stebbins (1985) (Figure 1).

Abundance. No data are available to quantify historical abundance, and observations in the literature regarding this are conflicting. For example, the FTHL was described as "rare" by Bryant (1911) and Klauber (1939). Pianka and Parker (1975) stated that horned lizards in general are not very abundant, and are often rather uncommon. Although it was unusual if he caught more than two specimens a day, Norris (1949) speculated that this was due to the FTHL's cryptic coloration, burrowing ability and escape speed, and that this lizard was probably "fairly common" in his study area near Palm Springs in Riverside County. Between February 1961 and October 1964, Wilbur Mayhew (unpubl. data) and his students collected 381 FTHLs and found 121 dead ones along 11.3 km (7 mi) of Highway 78, between the Highline and Coachella Canals in Imperial County. Mayhew concluded in his field notes that the FTHL was one of the most abundant reptiles occurring in the creosote bush scrub in that area.

Current

Distribution. The FTHL occurs in southeastern California (generally east and south from the Palm Springs area in the Coachella Valley), extreme southwestern Arizona (south of the Gila River and west of the Gila and Tinajas Altas Mountains), northeastern Baja California Norte, Mexico (east of the Sierra de Juarez in the Laguna Salada and Yreka basins) and in northwestern Sonora, Mexico (north and west from Bahia de San Jorge to the delta of the Rio Colorado) (Johnson and Spicer 1985). A more precise description of its present geographic range in California is given by Turner et al. (1980):

> "The distribution of *P. mcallii* extends from near the confluence of the San Gorgonio and Whitewater Rivers in Riverside County, south and east through the Coachella Valley into Imperial County along both sides of the Salton Sea. From the area between the Salton Sea and the San Diego County line, the range extends west into the Borrego Valley, although there may be important discontinuities in the badlands south of the Santa Rosa Mountains. This species is generally restricted to elevations below 250 m in the Borrego Valley, and there are small extensions into the lower portions of the Coyote Creek watershed, around Clark Dry Lake and southwest along San Felipe Creek where it emerges from the Vallecitos Mountains. *P. mcallii* occurs east of the northwestern edge of the Vallecitos and east and north of the Fish Creek Mountains at increasingly lower elevations -- down to below sea level in western Imperial County. The distribution of *P. mcallii* in southern San Diego County is less clear, although there are old records from as far west as 'Vallecito'. This area is near Highway S2, probably in the Vallecito Valley. This valley, and the Carrizo Valley, descending to the southeast, were not explored in 1979. In 1978, however, Mark Jorgensen collected *P. mcallii* at an elevation of 520 m in Indian Gorge, west of the Bow Willow Ranger Station. The species may occur to the east of Bow Willow in Carrizo Wash. If populations in southeastern San Diego County and southwestern Imperial County are continuous, the connection is probably via this wash. The agricultural portions of south-central Imperial County extending east from the West Side Main Canal, Westmorland, and the southern end of the Salton Sea to the Highline Canal; and from as far north as Niland to the Mexican border are essentially uninhabited by *P. mcallii*. The range extends eastward across East Mesa and the Algodones Dunes, except that the barren dunes themselves are not occupied. There are only a few localities along the east side of the

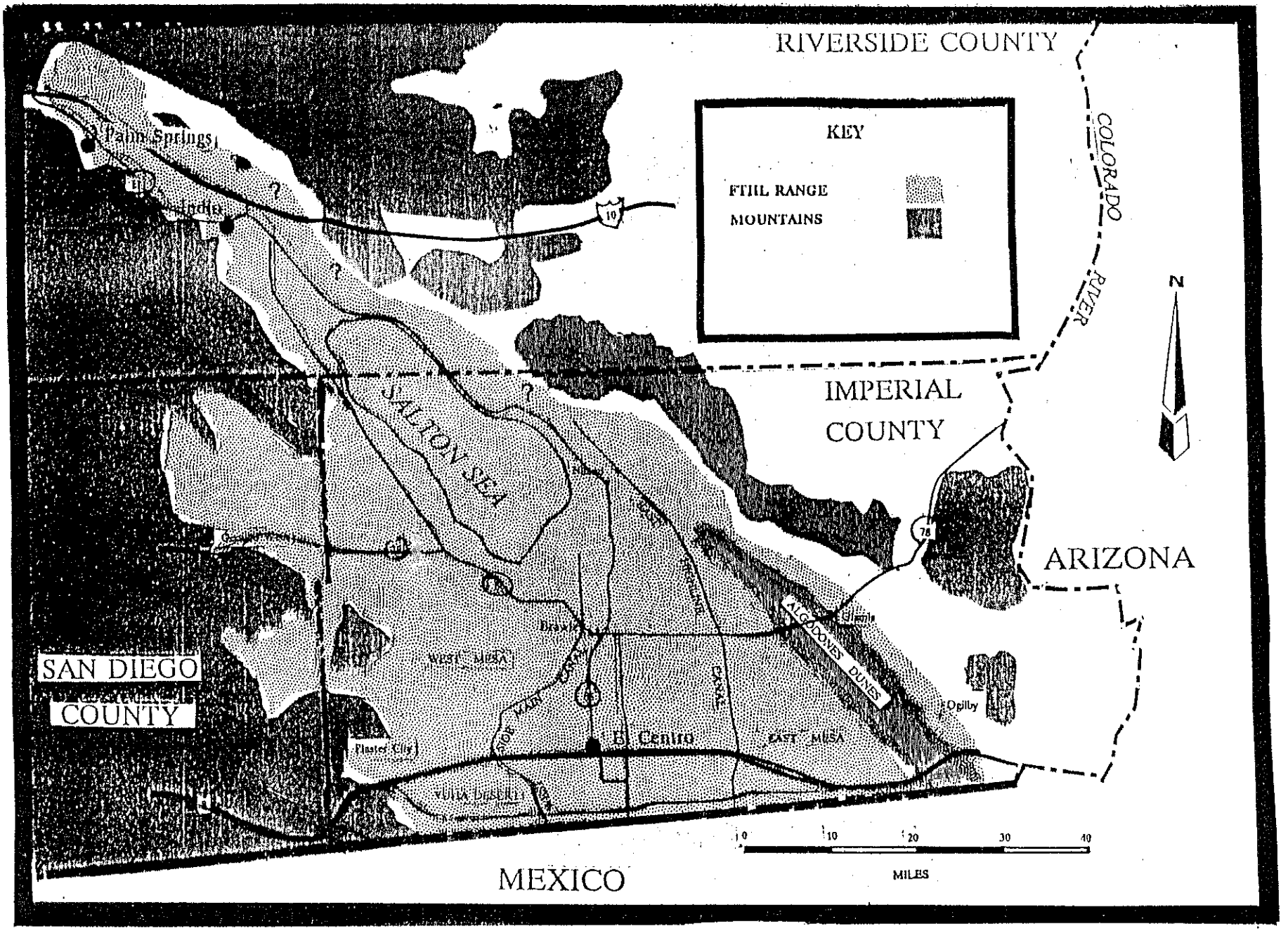

Figure 1. Historic range of the flat-tailed horned lizard (*Phrynosoma mcallii*) in California.

dunes, but the Chocolate Mountains, Cargo Muchacho Mountains and agricultural areas near Yuma probably separate California populations from those in Arizona. North of Niland there may be a narrow band of habitat between the Salton sea and the Chocolate Mountains continuous with the southeastern portion of the Coachella Valley."

Figure 2 summarizes this description.

The bulk of FTHL habitat (64%) lies within Imperial County, and is primarily administered by the Bureau of Land Management (BLM). In San Diego County, most of the FTHL habitat (68%) is managed by the California Department of Parks and Recreation (CDPR). Most of the habitat (74%) in Riverside County is privately owned, and zoned for development (Table 1). Some FTHL habitat in Riverside County, however, is interspersed with the 64 km^2 (25 mi^2) of habitat set aside for the endangered Coachella Valley fringe-toed lizard (*Uma inornata*) at the Coachella Valley Preserve (CVP) (Barrows, 1986).

Abundance. Until recently, little work has been done to quantify FTHL population trends. The task is formidable, since the sedentary nature, cryptic coloration, and patchy distribution of this species make the use of traditional reptile census techniques virtually impossible, and the probability of observing or capturing lizards is low, even with a large effort in areas where the lizard may be relatively abundant. Therefore, at the request of the BLM, Turner et al. (1980) developed a survey technique to estimate relative abundance and habitat quality of the FTHL based on counts of its scats seen per observer hour. The technique, modified by Olech (1984), assumes the number of FTHLs is directly proportional to the number of scats, and estimates relative abundance and corresponding habitat values of the species based on the combination of scat numbers and lizards observed. Using this methodology, the BLM initiated limited monitoring of FTHL relative abundance on some of the BLM-administered lands identified as optimal habitats by Turner et al. (1980). Baseline monitoring was conducted in 1979 and 1981, and the surveys were repeated in 1984. Results were reported by Olech (1986), and indicated the following trends in FTHL relative abundance:

(1) In the Yuha Desert, the trend was stable south of Highway 98, but had decreased significantly north of Highway 98.

(2) Significant, probably permanent, decreases have occurred in the southeast portion of East Mesa. Although the FTHL was well represented in portions of the study area, its status was poor in what was formerly the best East Mesa habitat.

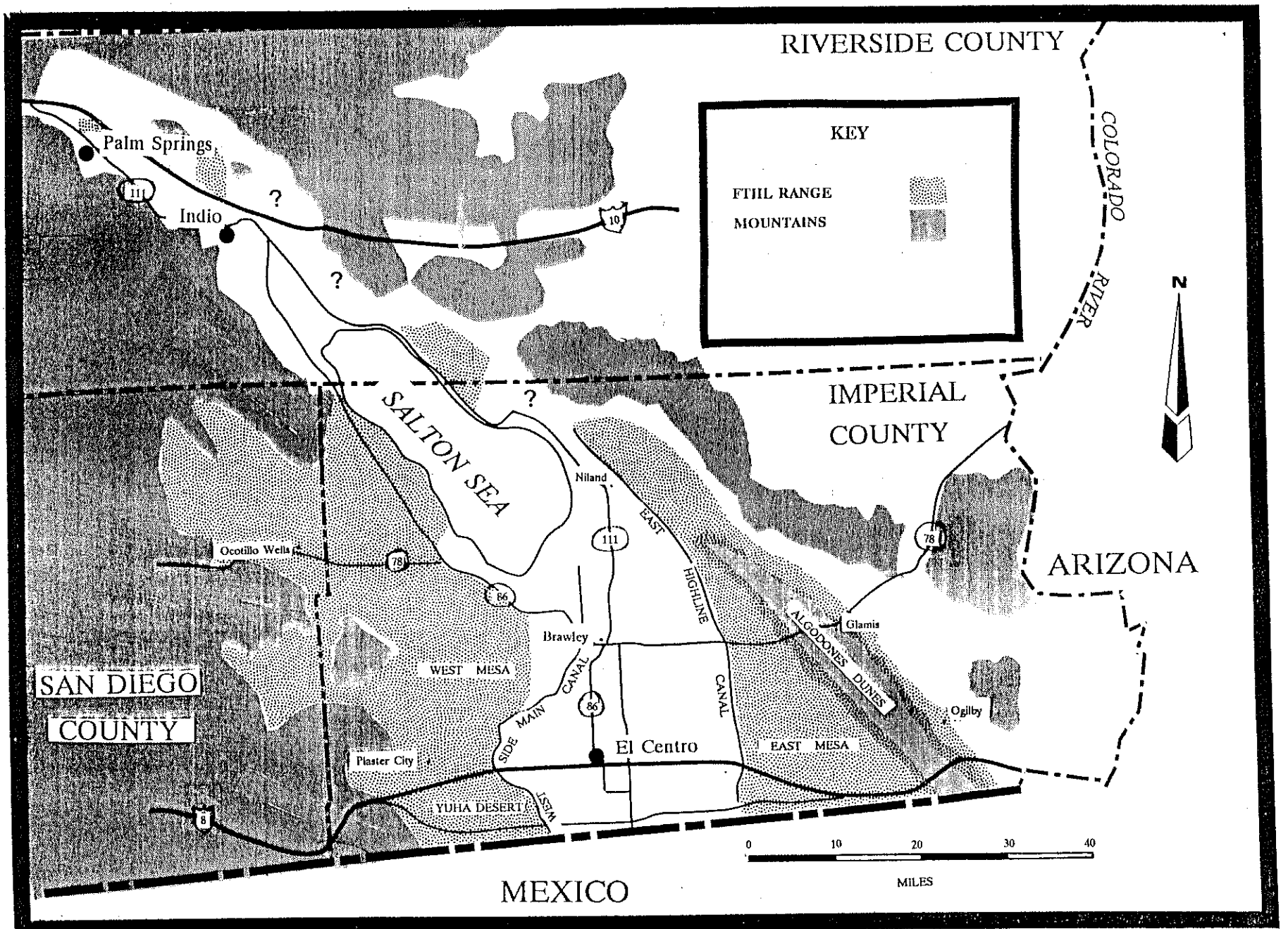

Figure 2. Current range of the flat-tailed horned lizard (*Phrynosoma mcallii*) in California.

TABLE 1. Land Ownership/Administration Within the Range of the Flat-tailed Horned Lizard (Phrynosoma mcallii) in California (2.59 km^2 = 1 mi^2) (Data from USDI, BLM 1989).

Landowner/ Administrator[1]	Imperial County		San Diego County		Riverside County		Total	
	km^2	% of total	km^2	% of total	km^2	% of total	km^2	% of total
BLM	2671	57.5	0	0	486	24.2	3157	43.4
USN	498	10.7	0	0	0	0	498	6.9
DPR	0	0	421	68.5	0	0	421	5.8
Private	1384	29.8	194	31.5	1493	74.2	3071	42.2
Other[2]	93	2.0	0	0	32	1.6	125	1.7
TOTAL	4646	63.9	615	8.5	2011	27.6	7272[3]	100.0

[1]BLM = Bureau of Land Management
USN = United States Navy
CDPR = California Department of Parks and Recreation

[2]Primarily Indian reservation or state school lands

[3]This is an overestimate of habitat; see text under "Habitat Requirements"

(3) Although insufficient data were collected to determine trends, the status of the FTHL at West Mesa appeared to be good.

Less extensive monitoring conducted by the BLM in 1987 indicated a stable trend in one portion of East Mesa, but continuing, significant decreases in the Yuha Desert and portions of West Mesa (USDI, BLM 1989). Results of 1988 monitoring indicated a stable to decreasing trend in East Mesa and West Mesa, and a decrease in the Yuha Desert (memorandum from G. B. Koski, El Centro Resource Manager, BLM, to G. Hillier, California Desert District Manager, BLM 1988).

Limited monitoring performed by CDPR personnel in the Ocotillo Wells State Vehicular Recreation Area (Ocotillo Wells SVRA) during 1986 indicated significant declines had occurred in this area compared to a 1978 survey (Mark Jorgensen, Naturalist, Anza Borrego Desert State Park, pers. commun. to Mayhew and Carlson 1986).

A pronounced reduction in FTHL numbers has been noted by scientists who have been familiar with the Algodones Dunes area for many years (pers. commun. of R. C. Stebbins and K. S. Norris to Luckenbach and Bury 1983). During an intensive study there, Luckenbach and Bury (1983) found only three individuals; this is the area where Wilbur Mayhew and his students collected over 500 FTHLs during the early 1960's.

FTHLs occur in low numbers at the CVP (Barrows 1986; A. Muth and M. Fisher, herpetologists, Deep Canyon Research Center, pers. commun.), the area where Norris (1949) speculated that the species was fairly common.

Current distribution and abundance of the FTHL in the rest of its California range (primarily private land) is unknown. Arizona is concerned about the status of this species; it affords the FTHL special management consideration and has prohibited their collection (USDI, BLM 1989). The status of the FTHL in Mexico is not known, but significant declines in habitat have occurred there due to agriculture, urbanization, energy development, road construction, and off-highway vehicles (OHVs) (Johnson and Spicer 1985).

Essential Habitat

Fragmentation of FTHL habitat and the species' patchy distribution dictate that management and recovery actions be directed at those areas which are still large enough to maintain populations of this lizard in perpetuity. Surveys have indicated that relatively large, contiguous portions of high-quality FTHL habitat still exist on federal and state lands in the East Mesa

area, West Mesa area, and the Ocotillo Wells SVRA. It is not yet possible to delineate preserve boundaries within each of these areas, however, since the life history information on this species is insufficient to determine what constitutes a viable population. The necessary biological information (e.g. population sizes, densities, age structure, etc.) will likely be obtained within the next 3 years (see "California Department of Fish and Game" portion of "Current Management" section).

Threats

Habitat Destruction and Modification

It is difficult to document previous losses of FTHL habitat in many cases because of the species' non-uniform distribution and the paucity of quantifiable data which address the extent of habitat loss due to agriculture, urbanization, and other human activities. The comparatively recent creation of the Salton Sea, for example, the recreational developments associated with it, and the cultivation of land south of it destroyed a significant, but undetermined amount of FTHL habitat. Collecting records show that much of the Imperial Valley was FTHL habitat before it was developed for agriculture (Johnson and Spicer 1985). Paved roads are a significant source of FTHL mortality since the lizard is frequently found there (Klauber 1939) and is apparently not intimidated by vehicles (Mayhew and Carlson 1986). Wilbur Mayhew found 121 road-killed FTHLs over a four-year period in the early 1960's (Turner et al. 1978).

Off-Highway Vehicles. Off-highway vehicles are involved in competitive racing events, casual off-road use, camping, law enforcement activities, and maintenance of power transmission lines. There are currently 384 km^2 (148 mi^2) of FTHL habitat legally available for OHV use on both BLM and CDPR lands (Table 2, Figure 3). This includes a camping corridor allowed along the approved OHV routes, which varies in width from 7.6 m (25 ft) to 89 m (300 ft). Although the entire area available for camping may not be heavily utilized, minimal monitoring has been done to determine where camping concentrations occur and the extent of impacts on the FTHL and its habitat.

The CDPR land available for OHV use is in what has been characterized as the "most remarkable" of FTHL habitats (Turner and Medica 1982). The CDPR plans to expand the Ocotillo Wells SVRA eastward into 117 km^2 (45 mi^2) of FTHL habitat, pending the transfer of land ownership from the BLM (CDPR 1986).

Impacts of OHVs on desert ecosystems are complex (Figure 4) and well documented. One of the most important and persistent effects of OHVs is soil compaction. Soil compaction is a contributing factor to soil erosion and a cause of decreased plant growth (CDPR 1975). Soils most susceptible to compaction

TABLE 2. Areas Approved for Off-Road Vehicle Use in the Range of the Flat-Tailed Horned Lizard (*Phrynosoma mcallii*) in California.

Use Limited to Approved Routes of Travel	Area Disturbed km^2	Area Disturbed mi^2
Yuha Desert[1] (BLM)		
430 km of road; 3 m wide road 7.6 m camping allowed on either side	7.8	3
7.2 km of road; 3 m wide road No camping allowed	0.4	0.15
East Mesa (BLM)		
122 km of road; 3 m wide road 91.4 m camping allowed on either side	22.5	8.7
West Mesa (BLM)		
150 km of road; 3 m wide road 91.4 m camping allowed on either side	27.7	10.7
Ocotillo Wells State Vehicular Recreation Area Proposed Expansion (CDPR)		
45 km of road; 3 m wide road 91.4 m camping allowed on either side	8.3	3.2
Open Areas		
Ocotillo Wells State Vehicular Recreation Area (CDPR)[2]	56.5	21.8
Arroyo Salada[3] (BLM)	33.7	13
Plaster City (BLM)	119.1	46
Ogilby South (BLM)	20.7	8
Glamis and Pilot Knob Mesa (BLM)	46.6	18
Superstition Mountain (BLM)	41.4	16
TOTAL	384.7	148.55

[1]Number of kilometers does not include transmission line and roads closed to public use. This is the only area included in the above table where transmission line maintenance roads are closed to the public.

[2]See "California Department of Parks and Recreation" portion of "Current Management section.

[3]This area may become part of the Ocotillo Wells SVRA expansion, but will still be classified as an open area.

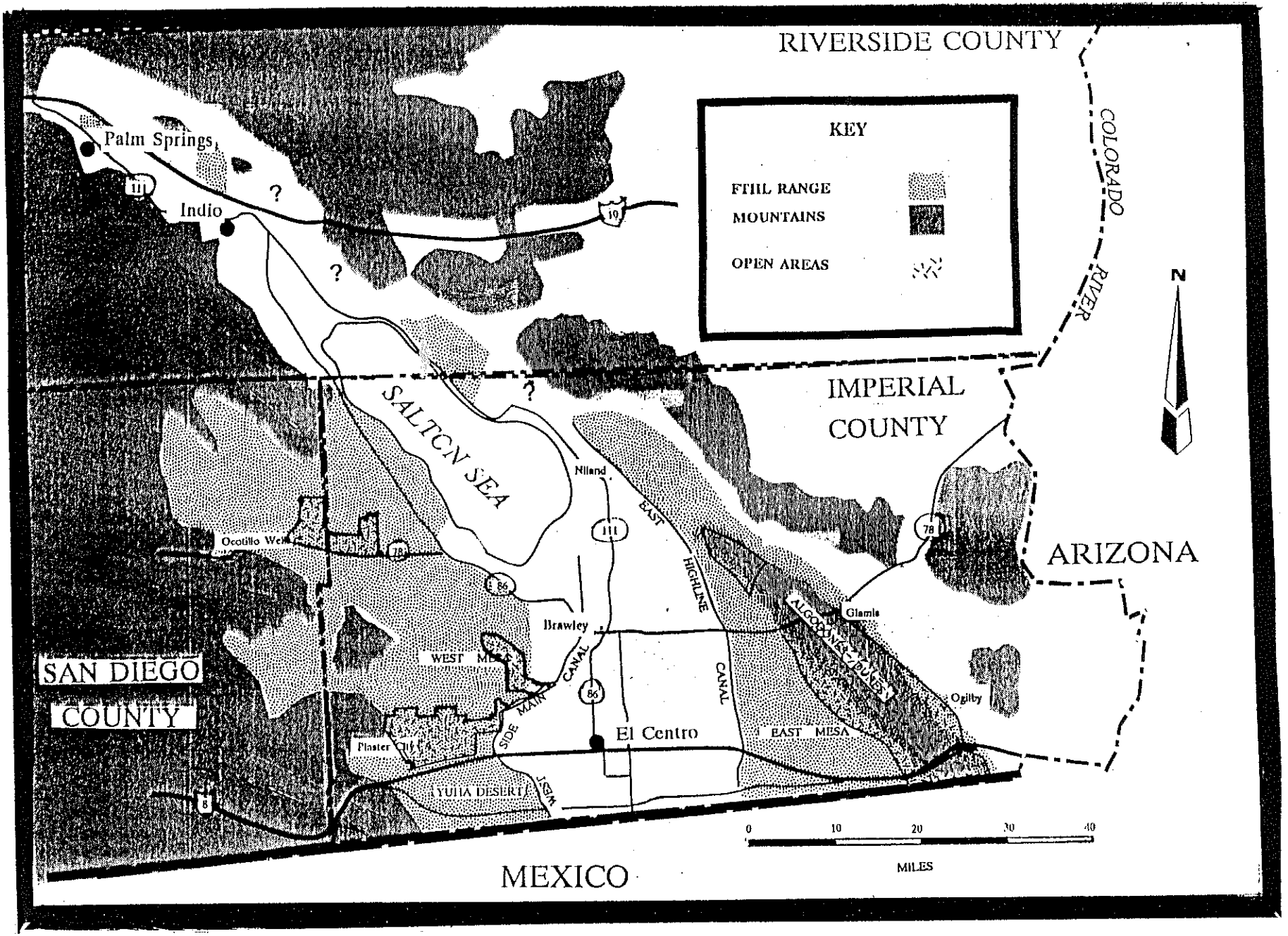

Figure 3. Authorized off-highway vehicle open areas within the range of the flat-tailed horned lizard (*Phrynosoma mcallii*) in California.

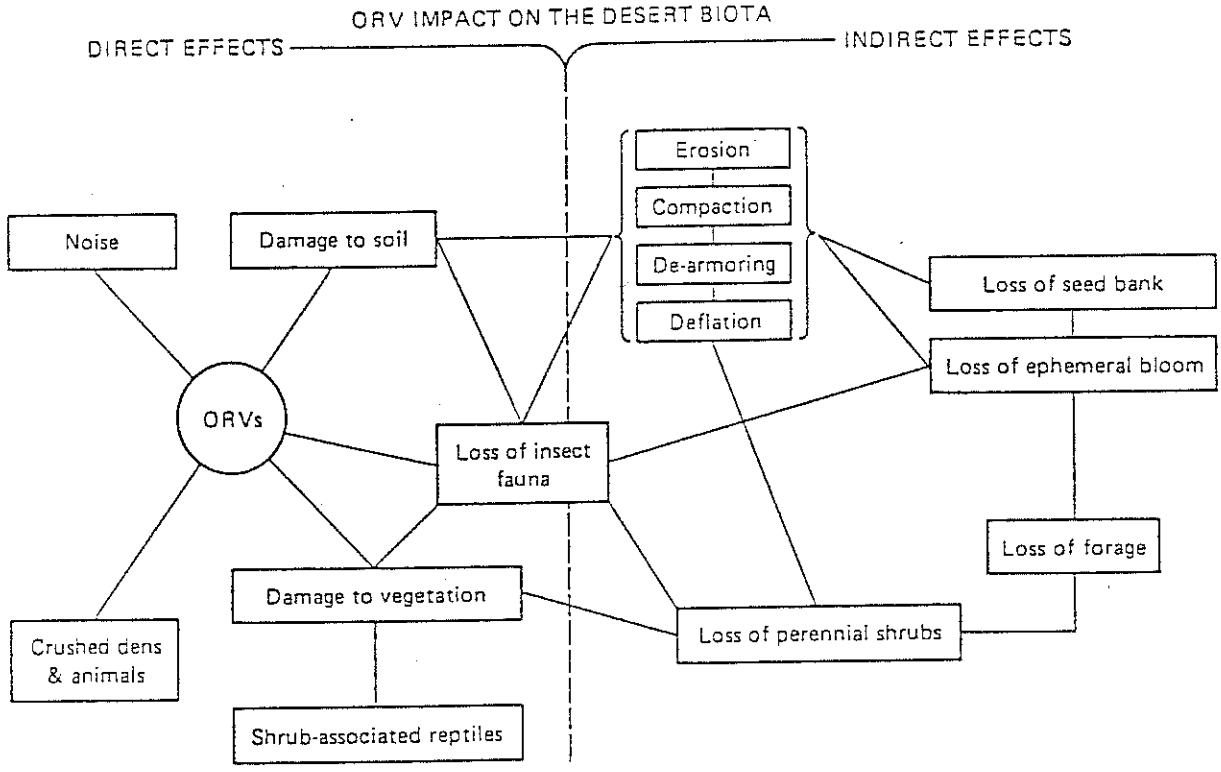

Figure 4. Impacts of off-road vehicles on flat-tailed horned lizards (*Phrynosoma mcalli*) and their habitat (after Luckenbach 1975).

are loamy sands or very coarse, gravelly soils with a wide range of particle size; soil types least affected by OHV traffic are sands and clays where the bulk of the soil particles are about the same size (Webb 1983). Algal crusts, common in sandy and clay soils of the desert, play an important role in surface stability, and can be destroyed with a single pass of a vehicle (Wilshire 1983). Soils form the physical and chemical basis of the desert ecosystem, and desert soil formation is generally so slow that on a human time scale, it is essentially a non-renewable resource (Hinckley et al. 1983).

A single vehicle pass can destroy annual plants in the process of germination, and even mature plants can be uprooted and crushed at low levels of OHV use (Wilshire 1983). Annual plant species constitute 47% of Salton Sink flora (Lathrop and Rowlands 1983). Large shrubs are occasionally struck directly by vehicles, but are more often destroyed indirectly by erosion and sedimentation caused by vehicular denudation of adjacent land. For example, the mean density of perennials in the BLM's Plaster City OHV area, located in the Yuha Desert, decreased by 39% from 1953 to 1972 (Lathrop 1983). In another study, Luckenbach and Bury (1983) used paired plots to compare unused areas (controls) of the Algodones Dunes with those heavily used by OHVs. Control plots had 2.4 times the number of plant species, 9.4 times the cover, and 40 times the volume of shrubby perennials. Loss of vegetation can impact the FTHL by reducing the amount of cover available to it and the source of forage material available to harvester ants, the lizard's main prey.

Luckenbach and Bury (1983) also found that there were 1-8 times the number of lizard species, 3-5 times the number of individuals, and 5-9 times the biomass of lizards on control plots, as compared to the OHV-impacted areas.

Direct evidence of injury or death of desert reptiles due to OHV activities was also documented by these researchers. Over the course of their study, they found eleven dead Colorado Desert fringe-toed lizards (*Uma notata*), most of which were partly buried in the sand, indicating that the lizards had been killed in that position. This type of mortality could also be expected for the FTHL, since Mayhew (1965) found that 82% of them hibernated within 5 cm (2 in) of the surface (Heath 1965, Mayhew 1965).

OHV use may also facilitate poaching of lizards (CDPR 1975). Stewart (1971) cited exploitation by the pet industry as an important factor in the decline in FTHL numbers.

The undisturbed desert is a relatively quiet environment (Figure 5). Sounds made by OHVs likely have a negative impact on FTHLs (CDPR 1975). The high-intensity sounds of massed off-road motorcycles have been shown to severely damage the acoustical

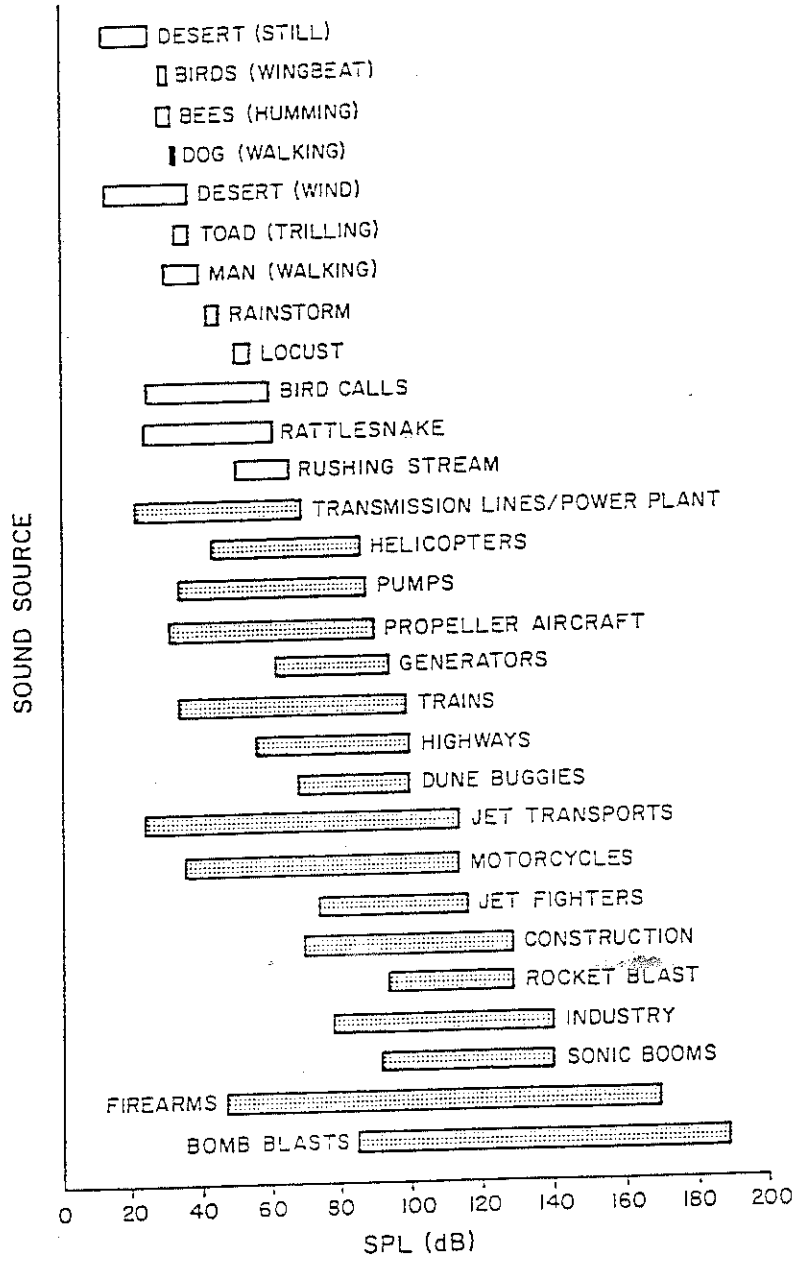

Figure 5. Relative noise levels (sound pressure levels) of natural and mechanized sound sources in the Colorado and Mojave Deserts of California (from Brattstrom and Bondello 1983). Published with permission of Brattstrom.

sensitivity of the desert iguana (Bondello 1976). Brattstrom and Bondello (1983) demonstrated that exposure to dune buggy sounds of moderate intensity (95 dBA) and short duration (500 sec) resulted in a hearing loss in the Mojave fringe-toed lizard (*Uma scoparia*). The Mojave fringe-toed lizard, like the FTHL, seldom escapes into deep burrows which could muffle the sound, but instead remains on the surface or rapidly digs a shallow burrow. The importance of hearing to lizards is probably related to prey acquisition and predator avoidance, since sounds created by foraging insects, digging and sniffing canids (foxes, coyotes), snakes crawling on loose gravel, striking rattlesnakes and swooping owls are all in the frequency range of hearing which is lost after exposure to the aforementioned OHV noise levels (Brattstrom and Bondello 1983).

Olech (1984) stated that unauthorized OHV use and approved OHV racing appeared to be a factor in the declines observed in FTHL relative abundance in the Yuha Desert.

Geothermal Development. A major Known Geothermal Resource Area (KGRA) occurs in the BLM-administered East Mesa; this area also contains a large block of FTHL habitat (Figure 6). Seventy-one percent of the 119 km^2 (46 mi^2) East Mesa KGRA has been leased to geothermal interests.

Twenty-five percent of the land leased in the East Mesa KGRA has been developed in FTHL habitat. Although only 0.5 km^2 (124 acres) has been entirely converted to geothermal facilities (roads, well pads, power plants, storage facilities, etc.), the impacts associated with this development have a significant effect on a much larger area. Direct habitat loss results from the destruction of vegetation and soils during exploration, drilling, and construction. Noise from cooling towers, drilling, and power plant operation, as well as human presence, can extend the impacts beyond the area actually physically disturbed in a geothermal field (Suter 1978). Although Anspaugh et al. (1976) predicted noise levels from geothermal development in the Imperial Valley would not exceed 80 dBA and would therefore not be detrimental to wildlife, Brattstrom and Bondello (1983) found that ambient noise levels in the undisturbed desert rarely exceed 45.5 dBA.

Direct effects on habitat may occur from cooling tower emissions and spray ponds that result in drift which may contain arsenic, boron and ammonium salts. Chlorosis and necrosis on the leaves of trees and shrubs within 500 m (1,640 ft) of the Geysers cooling towers is believed to be caused by boron from drift (Sharp 1976, cited in Suter 1978). Hydrogen sulfide, also emitted, may be toxic to vegetation downwind of the emission site and contributes to the acidification of rain (Suter 1978). Damage to vegetation could impact the FTHL by reducing the food

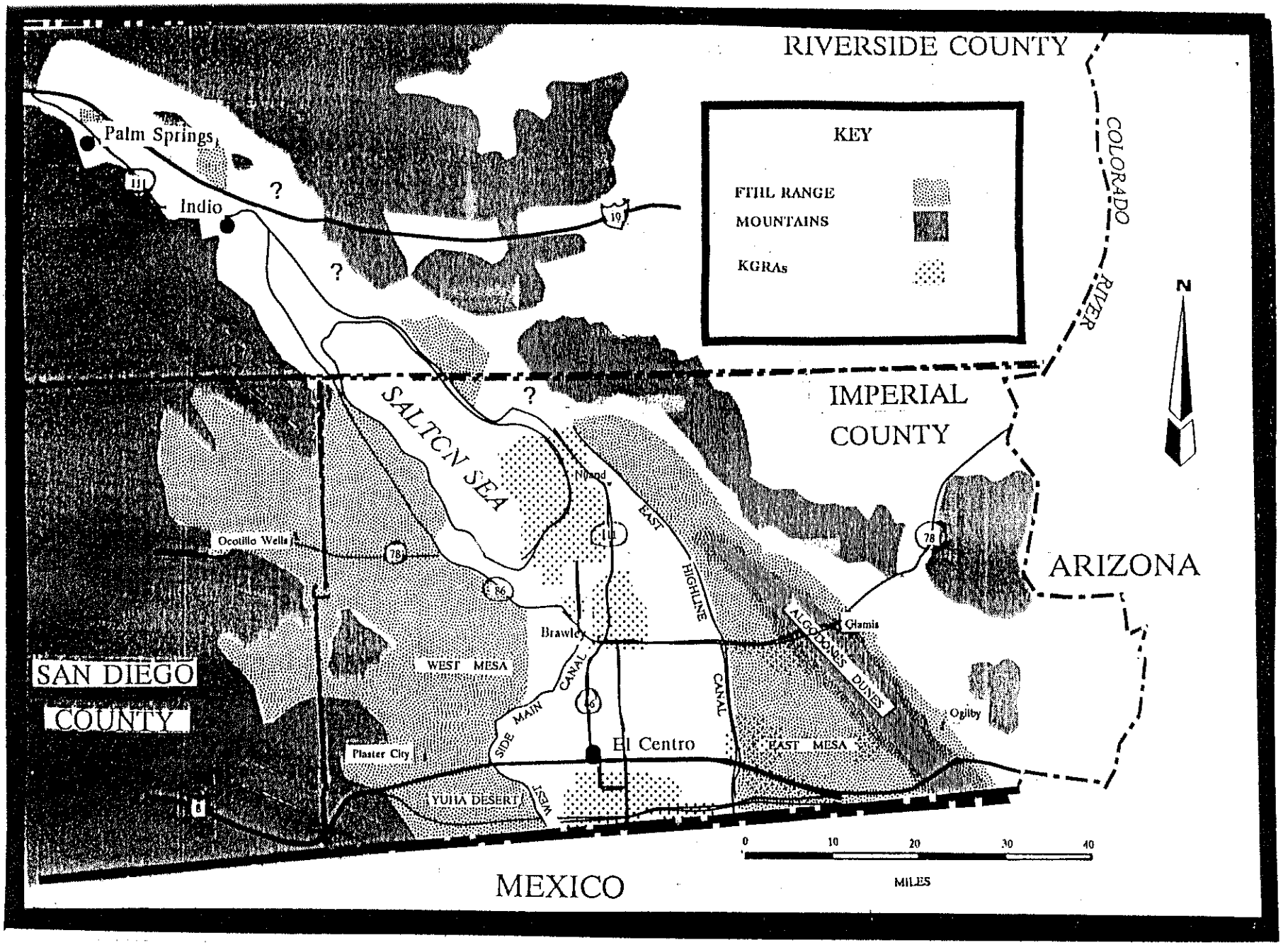

Figure 6. Known geothermal resource areas (KGRAs) within the range of the flat-tailed horned lizard (*Phrynosoma mcallii*) in California.

base of its main food item, harvester ants. Accidental and controlled brine spills can be expected and creosote bush is sensitive to soil salinity (Romney et al. 1976). Roads constructed for geothermal development, like those created for powerline maintenance, might also serve as an attractant for OHV users and facilitate their exploration of previously pristine areas, resulting in unauthorized road proliferation and concomitant habitat destruction (Westec Services Inc. 1981).

Oil and Gas Development. Currently, 214 km^2 (83 mi^2) of FTHL habitat are leased to oil and gas interests (BLM files, El Centro Resource Area Office 1989). Figure 7 shows the location of existing oil and gas leases in FTHL habitat. Of the leased area, 132 km^2 (51 mi^2) are located in areas designated by the BLM as Areas of Critical Environmental Concern (ACECs). No leased areas are being developed, however, due to poor exploration results. Should additional exploration for and subsequent discovery of either resource occur, the leasing process would be similar to that discussed for geothermal development in the "Current Management" section.

Depending on the amount of oil or gas available, impacts on the FTHL of extracting these materials could be much more extensive than those from geothermal development, since oil and gas development requires comparatively more well pads, maintenance roads, etc.

Gold Mining. Numerous mining claims have recently been staked out on BLM land in the area CDPR is proposing to expand its Ocotillo Wells SVRA into. The number and potential value of the claims is unknown at this writing (the claim markers were observed by CDFG/CDPR personnel in the area two days prior to the deadline for this report), but the presence of gold may preclude the BLM's sale of the land to the CDPR (L. Olech, Wildlife Biologist, El Centro Resource Area, pers. commun.).

If gold is found, it would be extracted by moving large areas of earth (i.e., strip mining) and extracting relatively small amounts of ore with cyanide.

Power Transmission Lines. Construction and maintenance of powerlines may have a number of detrimental effects on the FTHL and its habitat. Effects can include: (1) habitat destruction due to construction of access roads, storage yards, tower sites, and staging areas; (2) road-killed lizards; (3) increased potential for human taking of the species; (4) potential impacts from audible noise and electromagnetic radiation produced by powerlines (Westec Services, Inc. 1981); (5) increase in predatory birds; and (6) adverse effects from vehicular noise on lizards (Brattstrom and Bondello 1983). Robinette (1973) estimated that 25-40 ha (62-99 acres) of land are impacted for each kilometer (0.62 mi) of transmission line due to construction

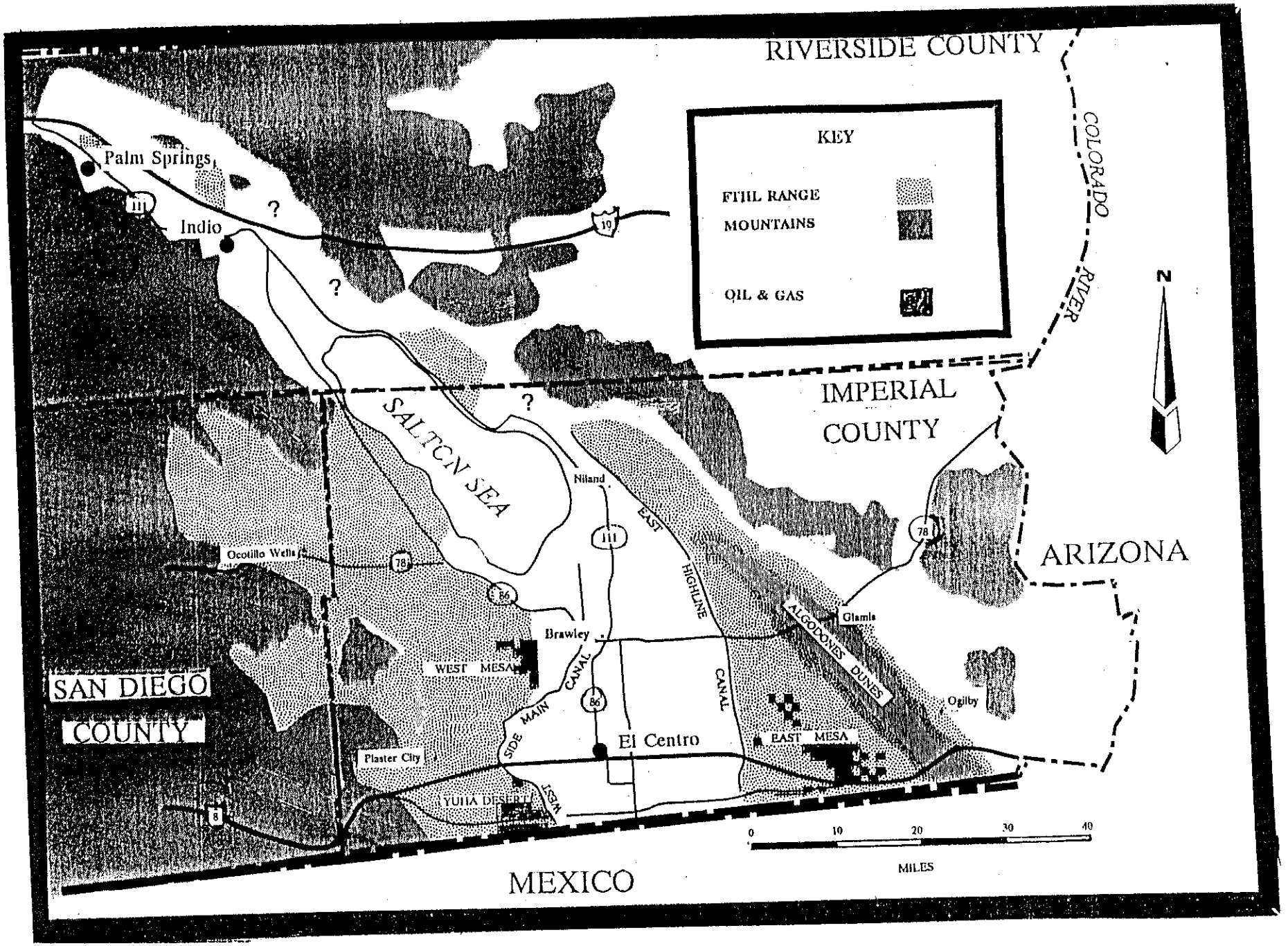

Figure 7. Location of sections containing oil and gas leases within the range of the flat-tailed horned lizard (*Phrynosoma mcallii*) in California.

activities. Estimates of natural recovery time required for perennial vegetation disturbed by powerline construction in the Mojave Desert range from 33 years (Vasek et al. 1975) to 100 years (Lathrop and Archibold 1980). Attempts at large scale revegetation of areas disturbed during the construction phase are not likely to be successful, and are usually prohibitively expensive (Brum et al. 1983). Although the greatest source of direct disturbance ceases following the construction phase, long-term disturbance occurs through continued use of access and service roads by maintenance personnel and OHVs, as well as the proliferation of unauthorized roads created by OHV users (Westec Services Inc. 1981).

An estimated threefold increase in electrical power transmission across the California Desert Conservation Area (Death Valley, Mojave and Colorado Deserts) is expected by the year 2000 to meet increasing southern California energy demands (USDI, BLM 1980). Currently over 8,000 km (4,971 mi) of overhead power transmission lines are present in the California Desert Conservation Area, impacting more than 28,000 ha (108 mi^2) of arid land. An additional 50,000 ha (193 mi^2) of land will be required to accommodate the projected increased need for electrical transmission (Brum et al. 1983). It is likely that at least some of the resultant impacts will occur in FTHL habitat.

Powerline related activities have been suggested as a possible factor in declining FTHL abundance observed in the Yuha Desert (Olech 1986). No monitoring has been conducted, however, to determine the effects of these activities on the FTHL or its habitat. The amount of FTHL habitat currently impacted by roads associated with powerline maintenance is included in the calculations for OHV impacts, discussed in the "Off-Road Vehicle" section.

Sand and Gravel Extraction. Sand and gravel removal permits currently exist for 20.5 km^2 (8 mi^2) of FTHL habitat (Figure 8). Extraction areas range in size from 2 ha (5 acres) to 259 ha (639 acres), and average 32 ha (79 acres). Over 220 ha (543 acres) are permitted for extraction in the 223 km^2 (86 mi^2) Yuha Desert ACEC. There are approximately 36 km^2 (14 mi^2) of sand and gravel resources in the Yuha Desert ACEC. Sand and gravel extraction is expected to increase 10-15% annually (USDI, BLM 1985).

Sand and gravel extraction impacts the FTHL by direct loss of habitat and potential lizard mortalities during quarry operations. Habitat loss can also occur due to road proliferation by OHV users off of the main access road. Most sand and gravel operations are in areas of low FTHL relative abundance, but it is not known whether this low abundance is due to the extraction operations, since most of the operations existed before systematic FTHL surveys were done. Some of these

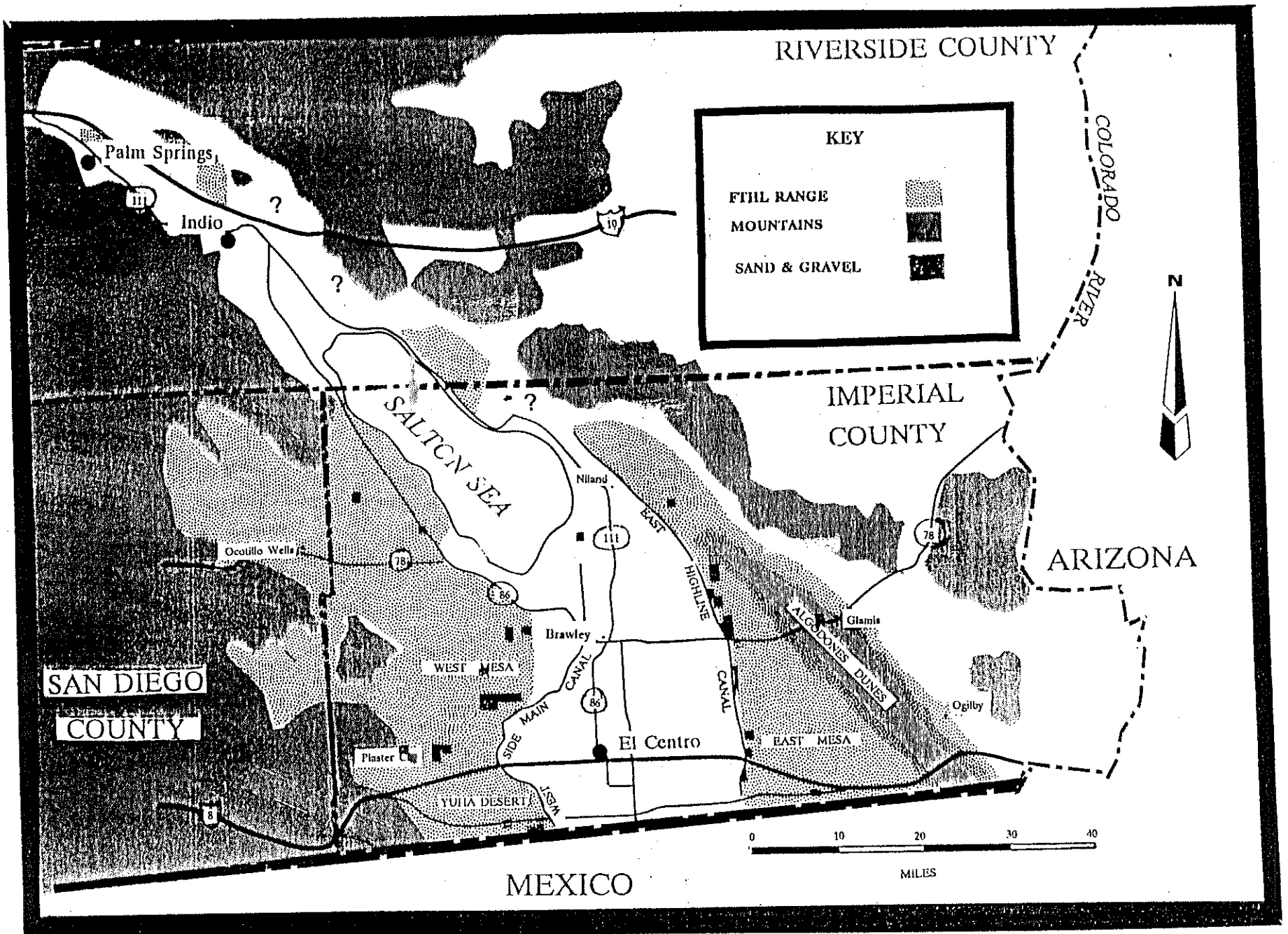

Figure 8. Location of sand and gravel extraction areas within the range of the flat-tailed horned lizard (*Phrynosoma mcallii*) in California.

extraction areas may have been important FTHL habitat, since they are surrounded by areas of high FTHL relative abundance.

Pesticide Spraying. Past and/or present use of pesticides has been suggested as a factor in the observed declines of FTHL numbers (Mayhew and Carlson 1986). The California Department of Food and Agriculture (CDFA) has conducted a control program on BLM lands in Imperial County for the beet leafhopper (*Circulifer tenellus*) since 1943 (CDFA 1985) (Figure 9). From 1956 to 1965, 33,380 kg (73,603 lb) of DDT (mixed with diesel oil) was sprayed over 460 km^2 (113,668 acres) in the Imperial Valley, including East and West Mesa. malathion, an organophosphorus insecticide, has been used from 1965 to the present (memorandum from D. R. Dilley, CDFA staff entomologist, to BLM Director E. Hastey, October 1978). The amount of area treated varies with rainfall; wet winters encourage large beet leafhopper populations (CDFA 1985). For example, only 2.2 km^2 (544 acres) were sprayed during 1987, whereas 39.5 km^2 (9,761 acres) were treated during 1988 (memoranda from R. L. Peterson, CDFA staff entomologist, to J. Willoughby, BLM range conservationist March 1988 and January 1989). Treatment of any particular area generally occurs every three to five years (CDFA 1985).

Pesticide drift from private lands adjacent to FTHL habitat has also been suggested as potential impact on this species (Olech 1984). Applegate et al. (1970) found that concentrations of insecticide residues in lizard tissues and eggs increased during the spraying season when lizards were within 15 km (9 mi) of cotton fields. The researchers did not, however, determine if these residues were harmful to lizards.

No studies have been conducted to determine the effects of pesticides on the FTHL, and little information on pesticide toxicity to lizards in general is available. According to Rado (1981), "both DDT and malathion are known to have killed blunt-nosed leopard lizards [*Gambelia silus*] in Fresno and Kern counties and have been identified as a major factor limiting the distribution of this species in the San Joaquin Valley (Snow 1972)". Montanucci (1965) stated that "...leafhopper control programs carried out in the western and southern parts of the [San Joaquin] Valley may be having deleterious effects on leopard lizard populations" and that "Entomologists...reported that dead leopard lizards found there had been killed by insecticide application." Montanucci further stated, however, that no conclusive studies had been done to determine the effects of pesticides on leopard lizards or other reptile species.

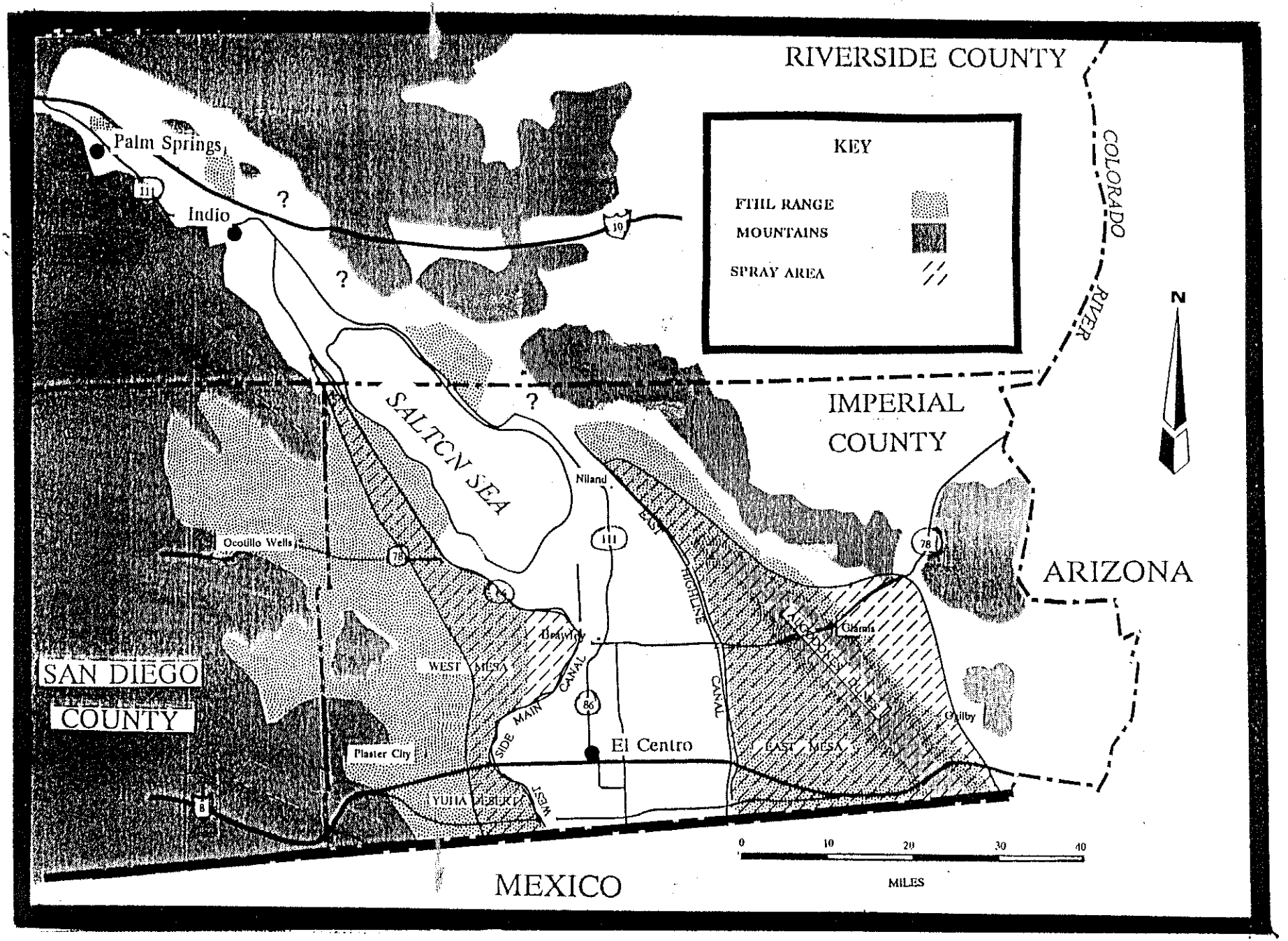

Figure 9. Potential area subject to malathion treatment for eradication of curlytop virus within the range of the flat-tailed horned lizard (*Phrynosoma mcallii*) in California.

Subsequent to the anecdotal accounts of Montanucci and Snow, Hall and Clark (1982) tested the response of the anole (*Anolis carolinesis*), a member of the same family as the FTHL (Iguanidae), to various pesticides. Direct ingestion of malathion (by intubation) had detrimental effects on anoles at a dosage similar to that deemed "slightly toxic" to birds and mammals. If the assumption is made that the effect of administering malathion to iguanids in the laboratory is comparable to effects seen in birds and mammals, then the indirect exposure of FTHLs to malathion in the field may not pose a significant hazard (letter from R. A. Marovich, CDFA Pesticide Registration Branch, to N. Kanim, Biologist, Sacramento Endangered Species Office, U. S. Fish and Wildlife Service). Giles (1970), in an admittedly flawed field study, found that malathion had no apparent effects on the turtles, snakes, frogs, and salamanders in a small, forested watershed. If malathion does not pose a threat to lizards, it is to the benefit of the beet leafhopper control program, since lizards have themselves been shown to be important predators of the beet leafhopper (Knowlton 1934, Knowlton and Janes 1933).

Of perhaps greater concern than the direct effects of pesticides on the FTHL is the potential impact pesticide use may have on the lizard's food source, since malathion is recommended for use against ants (CDFA 1985). Although the CDFA normally conducts leafhopper control operations in the Imperial Valley during February or March, spraying is occasionally required as early as December or as late as April (CDFA 1985). Application usually occurs from 0200-0900 h to avoid vaporization of the insecticide from high temperatures and drift due to wind (R. L. Peterson, pers. commun. to B. Bolster). Harvester ants are not likely to be active at temperatures below 10°C (50°F), begin to locomote normally at 13°C (55°F) and die at around 50°C (122°F) (Tevis 1958, Whitford and Ettershank 1975). The fact that the average winter minimum temperature is 5°C (41°F) and that spraying can occur until 0900 h allows for the possibility of impacts to ant colonies.

Habitat Fragmentation. It is virtually impossible to quantify losses of FTHLs due to habitat fragmentation that inevitably results from human activities which destroy habitat. Fragmentation occurs when a large expanse of habitat is transformed into numerous patches of smaller total area. These fragments are then isolated from each other by a matrix of habitats unlike the original. When the area surrounding the patches is inhospitable to species of the original habitat, and when species dispersal is low, the fragments become habitat "islands" and the populations of animals within the islands become isolated.

Habitat fragmentation has two components, both of which can cause extinctions: (1) reduction in total habitat area, and (2) redistribution of the remaining area into disjunct fragments (Wilcove et al. 1986). Reduction in total habitat area reduces population size and commonly results in loss of habitat heterogeneity. A seemingly uniform expanse of creosote bush scrub, for example, is actually a mosaic of different microhabitats. Individual fragments may lack the full range of habitat found in the original contiguous block; therefore, fragmentation increases the vulnerability of patchily distributed species like the FTHL to local extirpations. The formation of habitat islands decreases the likelihood of successful lizard immigration and emigration, and thus affects their dispersal. Small, fragmented populations are also more susceptible to inbreeding and the loss of genetic variation, due to an increase in genetic drift (Lacy 1988).

Current Management

Bureau of Land Management

The majority of FTHL habitat (44%) is administered by the BLM (Table 1). The BLM designated the FTHL as a sensitive species in the California Desert Conservation Area Plan (CDCA Plan) (USDI, BLM 1980). The goal of this designation is "to manage the public lands so as to prevent the deterioration of sensitive species' habitat thereby precluding the need for State or Federal listing of those species" (USDI, BLM 1982a). Criteria for determining whether a species is sensitive include:

a. Plants and animals under status review or considered as candidates for listing by the FWS;

b. Plants and animals proposed for federal listing by the FWS;

c. Plants and animals whose numbers are declining so rapidly that federal listing may become necessary;

d. Plants and animals with typically small and widely dispersed population; and

e. Plants and animals specialized in unique habitats (USDI, BLM 1982b).

Special Management Areas. The BLM also assigns special designations to portions of the land it manages. Three Areas of Critical Environmental Concern (ACECs) located in East Mesa, the Yuha Basin (Yuha Desert), and West Mesa have been established as special management areas for the FTHL (Figure 10, Table 3). An additional area, the San Sebastian Marsh ACEC/WHA, although not established for the FTHL, includes some habitat. Eleven percent

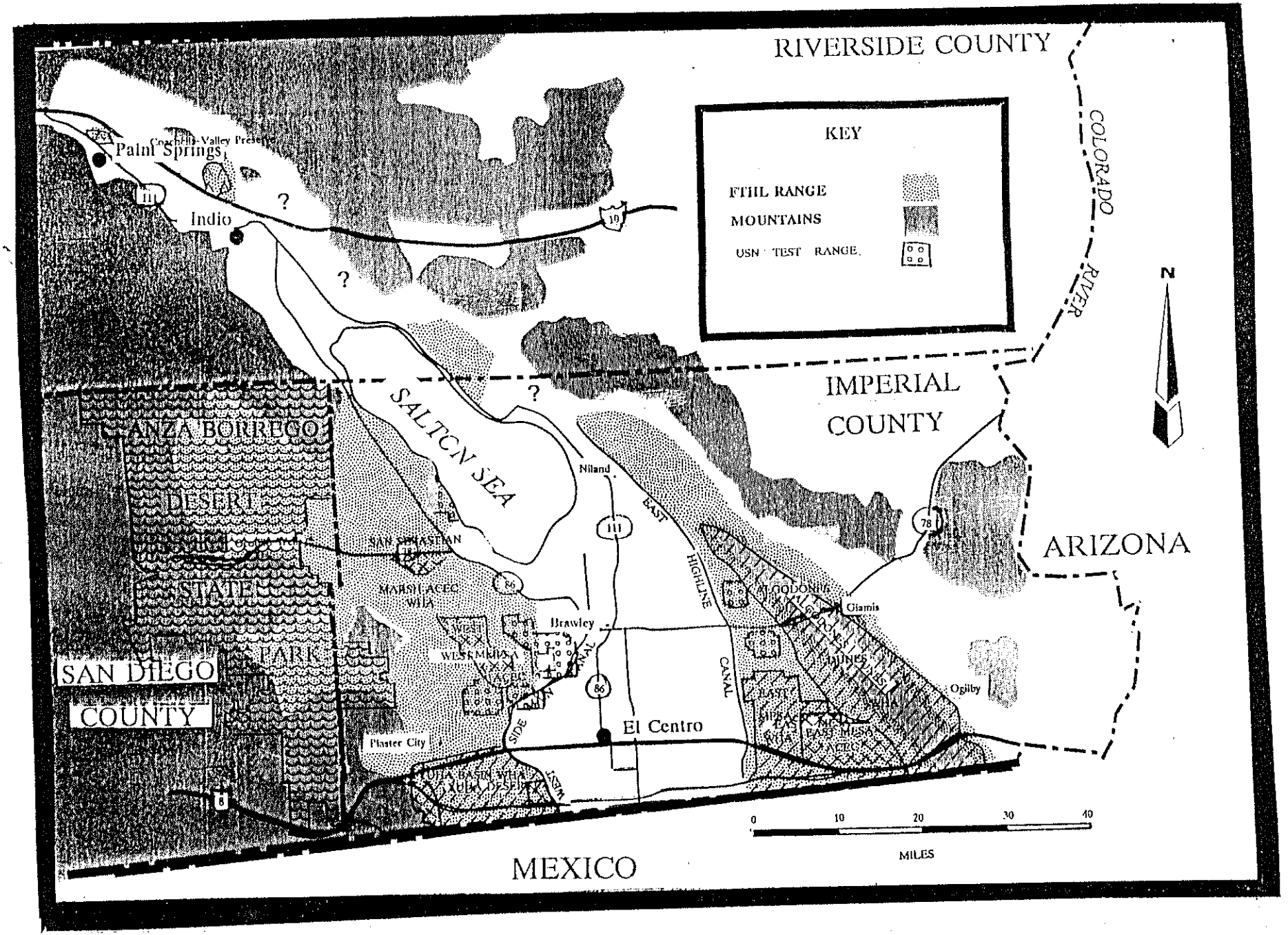

Figure 10. Special management areas within the range of the flat-tailed horned lizard (*Phrynosoma mcallii*) on State or Federal lands in California.

TABLE 3. Amount of Flat-Tailed Horned Lizard (*Phrynosoma mcallii*) Habitat in Special Management Areas Administered by the Bureau of Land Management in California.

	km^2	% of Total Habitat
East Mesa WHA/ACEC	462	6.4
Yuha Desert WHA/ACEC	223	3.1
West Mesa Area	80	1.1
San Sebastian Marsh ACEC/WHA	29.5	0.4
TOTAL	794.5	11.0

of the FTHLs habitat is in BLM special management areas. Designation of an area as an ACEC is the BLM's commitment to determine and provide for special management needs of the FTHL (USDI, BLM 1980). Management prescriptions outlined in ACEC plans receive priority for preparation, implementation and funding. For example, monitoring of FTHL trends in East Mesa and the Yuha Basin has been a high priority. Restrictions on OHV racing and development of Route of Travel Maps called for in the ACEC plans have also been completed.

Designation of an area as an ACEC does not preclude other land uses from occurring, however. The goals of ACEC designation as stated in the CDCA Plan (USDI, BLM 1980) are:

(1) Identify and protect the significant natural and cultural resources requiring special management found on BLM - administered lands in the CDCA;

(2) Provide for other uses in the designated areas compatible with the protection and enhancement of the significant natural and cultural resources; and

(3) Systematically monitor the preservation of the significant natural and cultural resources on BLM-administered lands, and the compatibility of other allowed uses with these resources.

Within the three ACECs there are 150 km^2 (58 mi^2) of other uses allowed, not including approved routes of travel. This includes 16 km^2 (6 mi^2) of land in the East Mesa KGRA which overlaps with the ACEC, 132 km^2 (51 mi^2) of land leased to oil and gas interests, and 2 km^2 (0.8 mi^2) of land permitted for sand and gravel extraction. Approved routes of travel, including camping corridors, account for an additional 30.7 km^2 (11.87 mi^2) of land use within the ACECs established for management of the FTHL.

The BLM has also established two Wildlife Habitat Areas (WHAs) as special management areas for the FTHL; the Yuha Basin WHA (the boundaries of which are the same as for the ACEC) and the East Mesa WHA (Figure 10). WHAs are management units identified for the preparation of Habitat Management Plans (HMPs). HMPs are prepared for areas that require intensive management programs. WHAs can be placed in any multiple-use class (from closed to intensive), and recommendations included in the HMP are limited by the classification assigned. HMPs do not get as high a priority as ACECs for preparation and implementation (USDI BLM 1980). HMPs have been prepared for the FTHL in the East Mesa and Yuha Basin WHAs (USDI BLM 1982c, 1985).

The HMPs are written under the Sikes Act, which authorizes the BLM and state fish and game agencies to cooperatively develop and implement plans for the protection and development of wildlife habitat. The HMP allows fund transfers between agencies for the

completion of management prescriptions outlined in the plans, such as establishing primary routes of travel, revegetating closed routes, and adequately signing and enforcing route closures. To date, $30,000 has been authorized for management of the FTHL in the WHAs under the Sikes Act Agreement.

As part of the prescriptions outlined in the ACECs and HMPs, the BLM initiated a monitoring program (discussed in the "Current Abundance" section) to determine FTHL population trends as well as the effects of management prescriptions such as route closures and race course restrictions.

Multiple Use Conflicts. Much of the BLM's management of the FTHL is centered around solving multiple-use conflicts. Since neither ACECs nor WHAs exclude other uses, and much of the FTHLs habitat is not under the jurisdiction of an ACEC or WHA, the BLM must determine how best to satisfy all resource users. In the past, this has resulted in a compromise with the FTHL losing habitat. In order to assist in resolving these conflicts, the BLM, in cooperation with the California Department of Fish and Game (Department), has prepared a draft management plan (USDI, BLM 1989). The management plan is an attempt to design survey, management and mitigation strategies so that land use proposals that affect FTHL habitat can be more efficiently processed within the BLM's multiple use mandate.

The management plan defines mitigation and compensation required for the development of geothermal, oil and gas resources, and sand and gravel extraction in FTHL habitat. The amount of compensation required is determined by using a formula which takes into consideration the amount of habitat being impacted, the location and duration of impact, whether adjacent lands will be impacted, if the project is growth inducing, and if the project is cumulatively significant. The project proponent is then required to contribute to a fund for management of the FTHL. In addition to the compensation required, the geothermal developers are required to participate in a FTHL education program which consists of informing employees of the presence of the FTHL, its sensitive status, and the importance of remaining on approved roads. Signs explaining the FTHL's importance and sensitive status are placed along all roads within the geothermal development area every 0.10 mi. This education program appears to be successful, as there is little evidence of new development of unauthorized routes to date.

As discussed in the "Threats" section, the four activities which the BLM authorizes within FTHL habitat are geothermal exploration and development, oil and gas exploration and development, sand and gravel extraction, and OHV use. A lease is required for geothermal and oil and gas exploration and development. The lease grants the right to determine if there is a commodity worth developing. Before the land can be developed, the BLM must

prepare an Environmental Assessment (EA) to determine the environmental impacts of the proposed development. Development which occurs as a result of the lease has the potential to convert a portion or all of the leased land to uses not conducive to the continued existence of FTHLs. Activation of a lease can allow the conversion of habitat to well pads, roads, pipelines and power plants.

Although the BLM can deny use of the lease if it impacts the FTHL, this is unlikely, since the leasee has been paying for the lease, the BLM has a multiple use directive, and federal policies encourage domestic and alternative energy development. No leases have been denied to date. When development is approved, the BLM coordinates with the Department and the USFWS to determine a development configuration with the least impact. Most of the geothermal projects in East Mesa FTHL habitat have been modified to reduce direct impacts and habitat fragmentation. For example, in the southeastern portion of East Mesa, geothermal leases were restricted to "no surface occupancy" (i.e., no pipelines, roads, well pads, etc.); extraction was accomplished by slant drilling from an area with low numbers of FTHLs.

The majority of the East Mesa geothermal resource development has occurred subsequent to the BLM's designation of the FTHL as a sensitive species. The sensitive status reduces habitat loss by relocating facilities, but a net loss of habitat always occurs. If the FTHL is listed under the California Endangered Species Act, the lizard and its habitat will be afforded more protection. Currently if there is a difference of opinion between the BLM and the Department as to whether or not project impacts have been adequately mitigated, the final decision is made by the BLM's Area Manager. If the species is listed, and an agreement regarding mitigation cannot be reached at the local level, discussion would be elevated to the BLM's State Director and the Department's Director. Protection of the species and its habitat would therefore carry more weight than it currently does (USDI, BLM 1983).

If the FTHL is not listed, it is likely that most of the East Mesa KGRA will be developed, further reducing FTHL habitat. This assumption is based on the fact that not listing the species indicates to BLM that the species is not likely to become endangered.

Permits for sand and gravel extraction are issued by the BLM on a case by case basis following the receipt of an application to extract the material. A categorical exclusion or the more detailed EA must be completed before a permit is issued or denied. The permit can be rejected, and proposed extraction sites have been denied in the past due to FTHL concerns. The amount of habitat protected is not known, however, since no records are kept to track numbers of rejected applications.

Off-road vehicle use is regulated through the Route of Travel process. In this process, an assessment is made of the resource values present, the BLM multiple-use class, and the routes required for access by the public. Routes are then designated as open or closed based on the impacts to resources and OHV users. Closed routes are signed as such and rangers must then enforce the closures. Because of the large amount of area each ranger patrols, however, it is relatively easy for OHV enthusiasts to use closed routes or travel off of approved routes with little chance of being detected.

The BLM also authorizes OHV use in open areas (i.e. no route restrictions). Within FTHL habitat on BLM land, there are 262 km^2 (101 mi^2) of approved open areas (Table 2, Figure 3). Open areas primarily occur in what is now low relative abundance habitat. Portions of the open areas probably always supported a relatively low number of FTHLs, but others (such as Plaster City and portions of West Mesa), which are near or located between areas of currently high relative abundance, likely had large populations at one time.

The BLM chairs the Interagency Technical Advisory Committee (ITAC), a group comprised of agency personnel and members of academia, which meets periodically regarding FTHL management and research needs.

Border Patrol

Although the U.S. Border Patrol (BP) does not have management authority over any lands occupied by the FTHL, they regularly patrol in East Mesa, West Mesa and the Yuha Desert (Figure 11). The BP frequently intercepts aliens by driving directly to them, which often establishes a new set of tracks. This route can then be interpreted by OHV enthusiasts as an open route, since BLM's route signing policy is to sign only routes designated as closed. The OHV user assumes if a route is not signed closed it must be open, and the BLM has no authority to designate routes for BP use. Consequently, route proliferation and habitat destruction has become a serious problem throughout large areas of FTHL habitat (L. Olech, pers. commun.).

Listing the FTHL will likely have no effect on BP activities, but the BP will be encouraged by the Department to participate in ITAC meetings in an attempt to minimize these conflicts.

California Department of Parks and Recreation

Six percent of FTHL habitat in California occurs on CDPR lands in Anza Borrego Desert State Park (ABDSP) and Ocotillo Wells SVRA (Table 1). ABDSP and Ocotillo Wells SVRA are administered by different divisions within the CDPR. The Parks Division is

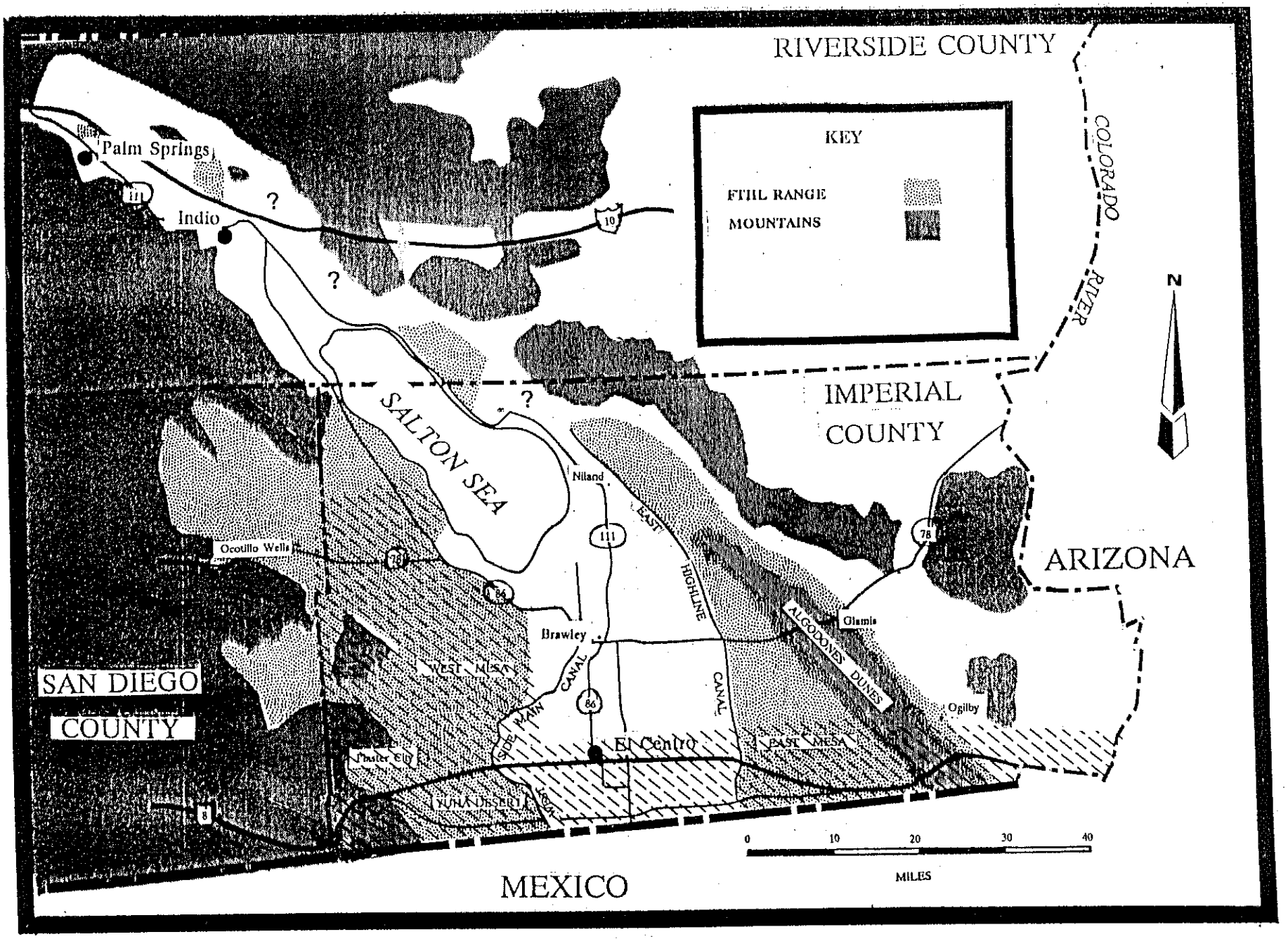

Figure 11. Area patrolled by U. S. Border Patrol within the range of the flat-tailed horned lizard (*Phrynosoma mcallii*) in California.

responsible for management in ABDSP, while the Off Highway Motor Vehicle Division (OHMVD) is responsible for management within the SVRA.

Management emphasis within the ABDSP is on resource protection. Here, the FTHL is protected from habitat destruction. The only OHV use allowed is for highway-legal vehicles on approved routes. FTHL habitat in the ABDSP along with a limited amount of habitat on the CVP in Riverside County, represents the only protected areas for the FTHL.

Management emphasis in the SVRA is on recreational opportunities. There are 57 km^2 (22 mi^2) of FTHL habitat in the SVRA. Although the entire area is available for OHV recreation, heavy, open-area use is concentrated within a portion of the SVRA about 3.2 km (2 mi) north of Highway 78. In the rest of the SVRA, use tends to remain on existing routes.

The OHMVD would like to expand the SVRA eastward into 116.5 km^2 (45 mi^2) of FTHL habitat in Imperial County. Much of this expansion area is currently managed by the BLM. Under CDPR management, use of most of this area would be limited to routes rather than being managed as an open area (G. Hund, Chief Ranger, Ocotillo Wells SVRA, pers. commun. to K. Nicol).

If the CDPR acquires the expansion area, approved routes will be graded and maintained. Expansion of the SVRA should not cause any additional impacts since the area is currently managed by the BLM as an open area. Impacts might actually decrease, since SVRA users seem to prefer graded roads over nongraded ones, and the CDPR would have more rangers patrolling the area than is currently possible under BLM management. This will likely decrease the number of new routes being formed.

The OHMVD is funding a wildlife inventory at the SVRA which includes surveys for FTHLs, and SVRA personnel are assisting the Department in setting up FTHL monitoring transects there. The OHMVD also funds studies (via the OHV Grants Programs) on OHV impacts to wildlife species in OHV areas. One such study, in the Algodones Dunes, includes the FTHL.

CDPR has regularly had a representative at ITAC meetings. Listing the FTHL will require the CDPR to consult with the Department to minimize impacts to the FTHL and to determine park and SVRA management strategies most beneficial to the lizard.

United States Navy

The USN administers 498 km^2 (192 mi^2) of land within the geographic range of the FTHL. Some of this is not FTHL habitat due to elevation (e.g. Superstition Mountain), some is used as

active bombing ranges, and the remaining area is withdrawn as a safety zone (non-bombed restricted access area). Impacts to FTHLs within bombing areas are hard to assess since access is limited and information on bombing frequency is classified. Impacts of periodic bombs and bullets, however, is probably far less detrimental than other threats discussed previously. Limited survey work at a target area in 1985 revealed the presence of numerous FTHL scats (L. Olech, pers. commun.). Theoretically, no impacts should occur in the safety zones, but the USN can drive anywhere within the area. OHV enthusiasts have been observed to use these routes in the West Mesa area, even though access is restricted. In the West Mesa area, before the USN land was relinquished to the BLM, much of it was used as an open area by OHVs. Historically, this was an area of high relative FTHL abundance. OHV use on current USN withdrawals has recently become more strictly regulated.

Listing the FTHL will likely have no effect on USN activities, but the USN will be encouraged to attend ITAC meetings as appropriate.

Private Lands

There is currently no management of FTHL populations on private land, and no surveys have been done to determine if lizards are present. The only input into management of FTHLs on private lands is via Department comments on Conditional Use Permits (CUP), discretionary permits issued by the County Board of Supervisors.

The County General Plan determines the zoning for private lands within FTHL habitat and what activities will be allowed. According to the Imperial County Ultimate Use Plan (part of the General Plan), the East Mesa area is slated for agricultural development, and the Yuha Desert has been designated for preservation (Figure 12). Currently, the County is considering a CUP to allow a new agricultural well in the Yuha Desert (Imperial County 1989). The well's capacity to pump 1500 acre-feet of water annually would transform FTHL habitat into fields of alfalfa and fruit trees. In addition to the 101 ha (250 acres) of potential FTHL habitat loss, agriculture attracts predatory birds like shrikes, and may affect the FTHL's habitat and prey base by reducing the amount of groundwater available to native plants.

Listing would affect the lizard or private lands only if the landowner's proposed actions were subject to the California Environmental Quality Act (CEQA).

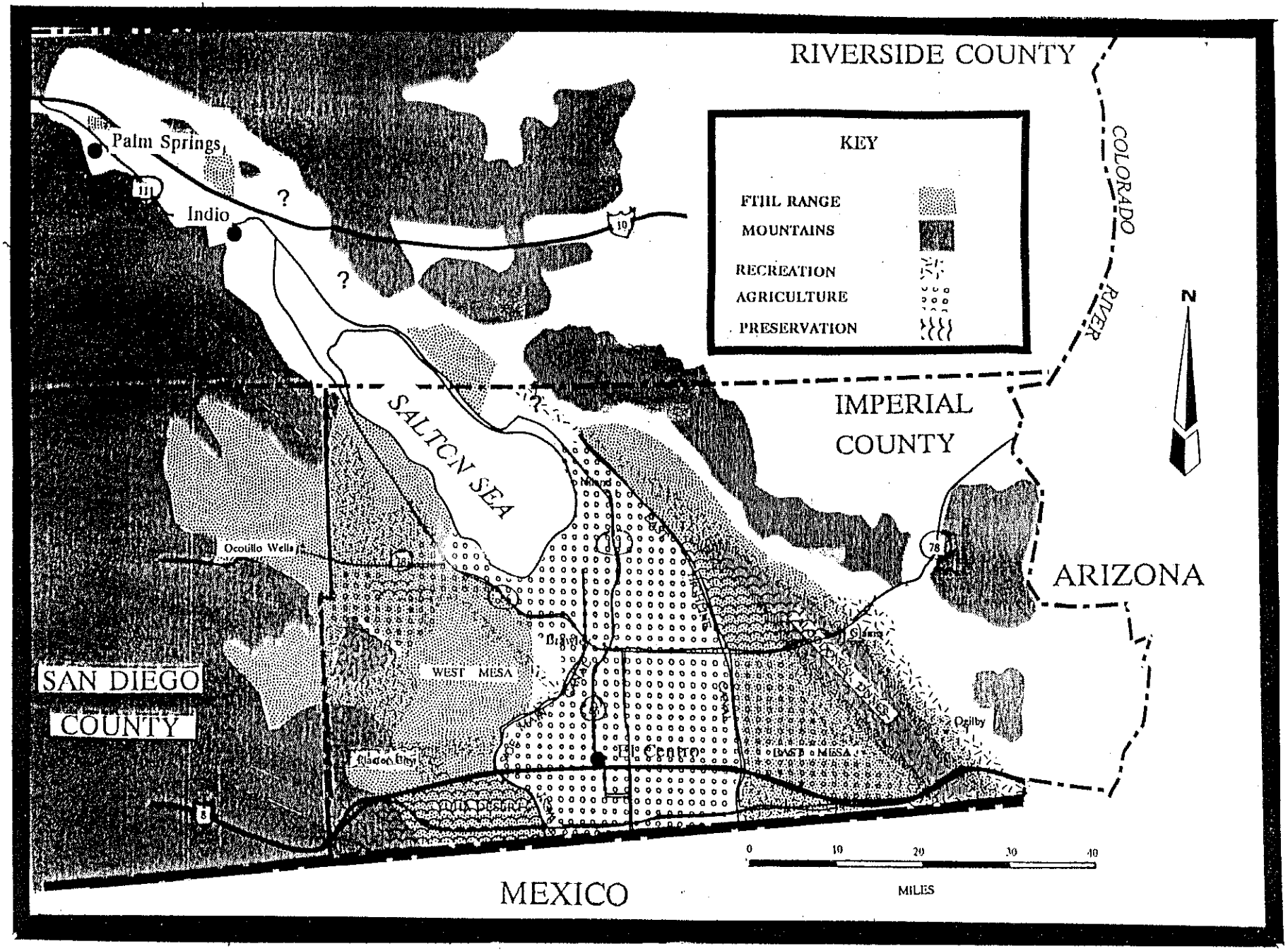

Figure 12. Projected land use within the range of the flat-tailed horned lizard (*Phrynosoma mcallii*) in California.

Coachella Valley Preserve

Although no systematic surveys have been performed, the FTHL is known to occur in the CVP (A. Muth, CVP Management Committee, pers. commun.). The CVP is a 64 km^2 (25 mi^2) area set aside to preserve habitat for the endangered Coachella Valley fringe-toed lizard. The area is jointly managed by the BLM, the USFWS, the Department and The Nature Conservancy. Portions of the CVP include FTHL habitat. Numbers and distribution of the FTHL here are not known, but the CVP manager plans to initiate surveys this year to monitor population trends.

California Department of Food and Agriculture

The CDFA was required to prepare an EA, which "expires" in 1990, for its beet leafhopper control program (CDFA 1985). Mitigation measures listed for the FTHL include checking the treatment area for FTHL activity prior to the application of malathion, and pre- and post-treatment area checks for ant activity. CDFA has been abiding by these measures, but not in any quantitative fashion. The annual CDFA memoranda specifically describe areas which were sprayed and quantities of pesticide used, but limit accounts of mitigation measures to statements like "applications were made...during early morning hours when weather was cool", "no flat-tailed horned lizard activity was noted", and "post treatment surveys indicated normal [ant] activity" (Memorandum from R. L. Peterson to J. Willoughby 1989). FTHL activity is extremely hard to observe, which is why their scats are used to determine relative abundance. "Cool" weather and "normal" ant activity are qualitative terms, and should be reported more specifically if the information is to be of use in evaluating potential impacts. CDFA's project leader for the spraying program has expressed interest in and the need for a scientific study evaluating the effects of the program on the lizard and its prey (R.L. Peterson, pers. commun. to B. Bolster). Department personnel will work with CDFA to develop this study and to improve the quality of routine data collected and reported for the program. Listing the FTHL will require the CDFA to consult with the Department and develop improved mitigation strategies for the lizard and its prey.

U. S. Fish and Wildlife Service

Currently the FTHL is a category 1 candidate for listing as an endangered species by the USFWS. Category 1 species are those for which the USFWS has sufficient biological information to prepare a proposal to list as Endangered or Threatened. A listing package is in preparation by the Laguna Niguel Field Office (R. Bransfield, pers. commun.)

Management of the species by USFWS personnel is accomplished through close coordination with the BLM on projects that occur on FTHL habitat, and participation on the ITAC. Due to time and funding constraints, the USFWS has not been able to participate in the management of the FTHL except to consult on proposed projects and attend ITAC meetings.

California Department of Fish and Game

With the exception of the CVP, the Department does not manage lands on which the FTHL is present. The Department's management of the FTHL involves regulating take of individuals (collection is prohibited), participation in the ITAC, obtaining Sikes Act funds for management of FTHL habitat on BLM lands, assistance in preparation of the BLM management plan for the FTHL, close coordination on preparation of ACEC plans and HMPs, consultation on projects that may impact FTHL habitat, and monitoring of population trends through systematic surveys. The Department also plans to fund a two-year study (1989-1991) which will obtain the biological information necessary to delineate preserve areas and improve monitoring and data acquisition techniques for the FTHL. The Department also plans to conduct a study in cooperation with the CDFA on the effects of pesticide use on the FTHL and its food source.

Because the Department does not own any FTHL habitat, management is closely coordinated with the BLM and the CDPR. The Department's management objective is to continue to work closely with these and other agencies to develop and implement management strategies such as habitat rehabilitation and establishment of preserves.

ALTERNATIVES TO THE PETITIONED ACTION

Should the Commission choose the alternative of not listing the FTHL, the results will be the loss of benefits (described below) available to a listed species. Protection and recovery of listed species commands an inherently higher degree of attention from the Department and other agencies than non-listed species, primarily because the fact of listing implies a greater urgency of action. Without the benefits of listing and the explicit recognition to act quickly, the species will continue to decline and may become endangered.

Commission action not to list the flat-tailed horned lizard could, in fact, have the reverse, unwelcome effect of increasing jeopardy to the continued existence of the species. It would be viewed by development interests, and land and resource management and regulatory agencies as well, that, despite a Department recommendation to the contrary, the Commission believes that the species is not deserving of special recognition and protection

afforded by the CESA, nor the added safeguards of California Environmental Quality Act (CEQA).

PROTECTIONS AFFORDED AS A RESULT OF LISTING

Some benefits from listing are (1) protection from taking of the species in the process of development activities subject to the CEQA, and (2) the allocation of resources by government agencies to provide protection and recovery. The CEQA includes safeguards in the environmental disclosure and review process wherever listed species are involved. These safeguards afford the Department the opportunity to secure protection and mitigation more readily than if the species were not listed. Commission action to list a species imparts a degree of status and recognition not enjoyed by non-listed species in the eyes of lead agencies and the public, causing the agency to give significantly greater consideration to the Department's recommendations.

When a species is listed, there is a greater likelihood that State and Federal land and resource management agencies will allocate funds and manpower to implement habitat protection and restoration measures. Due to increasingly limited government resources, and the growing list of threatened and endangered species in need of those resources, priority has been and will continue to be given to listed species over non-listed species.

ECONOMIC EFFECTS OF LISTING

Designation of the flat-tailed horned lizard as threatened will subject it to the CESA. Threatened status would not necessarily result in any significant adverse economic effect on small business or significant cost to private persons or entities undertaking activities subject to the CEQA. The CEQA presently requires local governments and private applicants undertaking projects subject to it to consider de facto threatened species to be subject to the same requirements as though they were already listed by the Commission in Section 670.5 (CEQA Guidelines, Section 15380, CAC). The flat-tailed horned lizard has qualified for protection under CEQA Guidelines Section 15380 for several years.

Required mitigation as a result of lead agency actions under the CEQA, whether or not the species is listed by the Commission, may increase the cost of a project. Such costs may include, but are not limited to, development of management plans, transplanting or establishing new populations, protective devices such as fencing, purchasing additional habitat, and long-term monitoring of mitigation sites. Project modification to avoid impacts may be a less costly alternative than implementing required mitigation. The total expenses incurred in hiring consultants, preparing management plans, transplanting and maintenance activities, and long-term monitoring may be more costly than setting aside

habitat for the lizard. Lead agencies may also require additional measures to be employed should the mitigation project fail, resulting in additional expenditures of funds by the proponent.

CONCLUSIONS

We conclude that the flat-tailed horned lizard is a threatened species, and further declines in its numbers and habitat would, in our professional judgement, ultimately result in its becoming an endangered species. Although the petitioners requested the species be listed as endangered, threatened status is more appropriate.

This lizard has declined as a result of habitat loss, destruction and fragmentation due to the creation of the Salton Sea, agriculture, urbanization, geothermal development, sand and gravel extraction, construction of powerlines and roads, and off-highway vehicle use. Pesticide spraying and gold mining are also potential problems. Without the benefit of listing, most of these threats will likely continue to be the source, either individually or in combination, of continued declines in FTHL numbers and habitat.

Much of the habitat for this species is either state or federally administered. Although we currently do not have the biological data necessary to delineate preserves of the size and quality necessary to maintain populations of this lizard in perpetuity, we plan to obtain this information in an upcoming two-year study. In the meantime, listing the species as threatened will help prevent further declines in population and habitat and will convey to public agencies the importance of protecting those areas which are likely preserve sites.

RECOMMENDATIONS

Petitioned Action

1. The Commission should find that listing as a threatened species is appropriate.

2. The Commission should publish notice of its intent to amend 14 CCR 670.5 to add the flat-tailed horned lizard (*Phrynosoma mcallii*) to its list of threatened species.

Recovery and Management Actions

The Department's objective in management and recover actions is the protection of a sufficient number of flat-tailed horned lizards in permanently protected sites. In order to recover the species, a predetermined number of populations must be protected,

monitored and proven to be self-sustaining to the satisfaction of the Department. At the successful conclusion of a standardized monitoring program, the Department may develop appropriate delisting criteria and reexamine the status of the flat-tailed horned lizard. When, in the Department's judgement, recovery goals and delisting criteria have been met, Commission actions may be initiated toward delisting of this species.

In order to achieve the Department's management and recovery objectives, the following actions are appropriate:

1. The Department should establish or continue the interagency coordination and commitment necessary to minimize continued loss and deterioration of FTHL habitat and ensure the preservation of habitat deemed essential to maintaining the species in perpetuity.

2. The Department, in conjunction with the BLM and the CDPR, should determine where the areas of highest quality habitat and highest FTHL numbers currently exist.

3. The Department should obtain the natural history information necessary to make informed management decisions and formulate a recovery plan. Necessary information includes such things as home range, life span, minimum viable population size, relationship of scat numbers to lizard numbers (for determining abundance and habitat quality more accurately), etc.

4. The Department should prepare a recovery plan.

5. The Department, in conjunction with the BLM and the CDPR, should establish preserves of a size sufficient to maintain self-sustaining populations of the FTHL in perpetuity.

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APPENDIX A

Comments Received on the Flat-Tailed Horned Lizard (*Phrynosoma mcallii*) Petition

U.S. Department of Justice

Immigration and Naturalization Service

Chief Patrol Agent

1111 N. Imperial Ave.
P.O. Box 60
El Centro, CA 92244

August 26, 1988

ELC 40/92-C
ELC 40/33-C

Ms. Betsy C. Bolster
Department of Fish and Game
Inland Fisheries Division
1701 Nimbus Road, Suite C
Rancho Cordova, California 95670

Dear Ms. Bolster:

We received a letter from Mr. Pete Bontadelli, Director, Department of Fish and Game, dated August 12, 1988, wherein he asks for input regarding a petition to adjust the status of the flat-tailed horned lizard (FTHL) from "protected" to "endangered". As we understand the petition, it also recommends establishment of at least three "reserves" where the FTHL is known to exist, for the purpose of protecting the species and its habitat.

The El Centro Border patrol Sector is responsible for patrolling much of the area depicted in figure #1 of the petition. Much of our patrol activity is along the International Boundary from the Algodones Dunes to the San Diego County Line. Vehicular intrusions on the East Mesa between the All-American Canal and the Algodones Dunes and Western Imperial County south of I-8 between Coyote Wells and the West Side Main Canal, is not an uncommon occurrence. This traffic is often related to drug and/or alien smuggling activities. The entire area is also an active area for illegal entries on foot by individuals as well as groups of up to fifty persons. To date in Fiscal Year 1988, El Centro Sector agents have apprehended over 21,000 illegal entrants attempting to make clandestine entries across the International Boundary. Agents have seized over 1,783 pounds of marijuana and cocaine in that same period. Patrolling the Border in vehicles is a necessary part of the continuing effort to control drug traffic and illegal entries.

Individuals and groups entering on foot are often pursued north of I-8 in the East Mesa area and north of Ocotillo Wells on the west side of Imperial County. The extreme high temperatures experienced in the Imperial Valley have often turned pursuit operations into rescue missions. Vehicles pursuit is the only effective and efficient means to successfully accomplish this task.

Attempts to circumvent our highway checkpoints which are located on Highway 78 and Highway 111 occur on a frequent basis. Off-road patrols in those areas are necessary to apprehend illegal aliens attempting that ploy. Again, mechanized equipment is necessary for an effective operation.

The attached copy of figure #1, which was included in the petition, has been highlighted to show the areas where we routinely patrol or get involved in lengthy tracking operations. As you can see, much of the area is the subject of the petition. Our patrols might appear to be indiscriminate, but it is only because the routes and efforts of violators are not completely predictable. Also, some of our activities are purposely conducted to prevent illegal entries and could be considered indiscriminate by uninformed people.

I would ask that considerable thought be given to the role of the Border Patrol as it pertains to today's society and the tremendous impact the restrictions associated with a reserve would have on that role if the highlighted areas are given that designation.

Thank you for the opportunity to provide our comments and concern about this issue.

Sincerely,

Dale A. Musegades
Chief Patrol Agent

County of San Diego

NORMAN W. HICKEY
CHIEF ADMINISTRATIVE OFFICER
(619) 531-6226
(Location Code 730)

CHIEF ADMINISTRATIVE OFFICE
1600 PACIFIC HIGHWAY, SAN DIEGO, CALIFORNIA 92101-2472

October 4, 1988

Betsy C. Bolster
Inland Fisheries Division
1701 Nimbus Road, Suite C
Rancho Cordova, CA 95670

Dear Ms. Bolster:

The San Diego County Board of Supervisors asked me to respond to your August 12, 1988 letter concerning the flat-tailed horned lizard, candidate for the endangered species list in California.

The County Department of Planning and Land Use has reviewed the petition and prepared written comments. I have attached their report for your consideration. Please feel free to contact Michael Evans if you have additional questions. Mr. Evans can be reached by calling (619) 694-3733.

Sincerely,

NORMAN W. HICKEY
Chief Administrative Officer

NWH:ss

Attachment

STATE OF CALIFORNIA

STATE LANDS COMMISSION

LEO T. McCARTHY, *Lieutenant Governor*
GRAY DAVIS, *Controller*
JESSE R. HUFF, *Director of Finance*

GEORGE DEUKMEJIAN, *Governor*

EXECUTIVE OFFICE
1807 - 13th Street
Sacramento, California 95814

CLAIRE T. DEDRICK
Executive Officer

September 16, 1988

Mr. Pete Bontadelli, Director
Department of Fish and Game
1416 Ninth Street, 12th Floor
Sacramento, CA 95814

Dear Pete:

Thank you for the opportunity to participate in the evaluation of a petition to list the flat-tailed horned lizard (Phynosoma mcalli) as an endangered species under the provisions of the California Endangered Species Act.

I have asked Dr. Diana Jacobs of our Division of Research and Planning to review the material we received from your staff. We are aware of the schedule you have established for the consideration of the petition by the Fish and Game Commission and will provide our comments by the requested date of November 14, 1988. Dr. Jacobs can be reached at the above address or by telephone at 5-5034.

Sincerely,

CLAIRE T. DEDRICK
Executive Officer

cc: Dr. Diana Jacobs
Paul T. Jenson, Department of Fish and Game
bcc: Dr. Mary Bergen
Betsy Bolster, Department of Fish and Game

2552S

RAY SILVER
DIRECTOR
(619) 694-2962

—FIELD OFFICE—
334 VIA VERA CRUZ
SAN MARCOS,
CALIFORNIA 92069-2638

County of San Diego

DEPARTMENT OF PLANNING AND LAND USE

MAIN OFFICE
5201 RUFFIN ROAD, SUITE B, SAN DIEGO, CALIFORNIA 92123-1666

September 27, 1988

TO: Norman W. Hickey,
Chief Administrative Officer MS A-6

FROM : Ray Silver, Director
Department of Planning and Land Use MS 0650

SUBJECT: Response to Referral on Proposed Listing of Endangered Species: Flat-tailed lizard, Within County Jurisdiction (CAO #200)

Concerning the above referral, Michael Evans of my staff has reviewed the Petition to the State of California Fish and Game Commission and discussed the matter with the Departments of Parks and Recreation and Public Works. The following responds to the points mentioned in your referral letter.

1. Known habitat in San Diego County

Staff agrees with the report and geographic range map included in the petition for listing: The species appears to inhabit sandy soils in desert areas within Riverside, San Diego, and Imperial Counties. It has one of the smallest distribution ranges of any of the species of horned lizards in North America. Within San Diego County, much of this range lies within the Anza Borrego State Park. Although the species is protected within the park, apparently recent increases in off-highway vehicle activities have adversely affected this species as well as other resources. The historic range of the species also includes non-park areas, most notably, the entire Borrego Springs Valley, as well as established communities and in-holdings within the park such as Earthquake ("Shelter") valley and Canebrake. These latter communities are relatively small areas of primarily small lot, second home developments which are limited by available groundwater supplies. The County General Plan Land Use Element designates much of this land 23 National Forest/State Park (with a residential density of 1 dwelling unit per 4, 8, and 20 acres), or as 18 Multiple Rural Use with the same residential density. The General Plan Land Use Element, for Borrego Springs Valley Planning area includes a wide range of land use types and densities, with much of the outlying

area designated as 18 Multiple Rural Use or 17 Estate (1 dwelling unit per 2 and 4 acres).

Within the Borrego Valley, considerable habitat exists for the species and it is not known what effect the past extensive agricultural activities have had on the species. Agricultural uses apparently have two kinds of adverse impacts to the species: 1) eduction or loss of habitat due to physical effects of preparing an area for crops and 2) because the species depends upon a very specialized diet of only a few species of desert ants, general use of pesticides for agricultural activities may have led to decreases in prey for lizard.

2. Impact of Listing on (County) Projects

The above referenced report does identify areas of high abundance for the species, most of these areas are within Imperial County. Within San Diego County the nearest existing County facility to these "high abundance areas" is a gravel pit used by the Department of Public Works near Clark Dry Lake; this operation uses desert pavement soil type as opposed to sandy soils and should not have an adverse effect on the species. There is some potential that normal maintenance activities along the rights-of-way of existing County roads in the desert could have some (probably negligible) effect on the lizard. Any new roads or other County facilities proposed within the range of the species should be reviewed for effects on the species. The County parks in the desert region may contain the species but these areas represent fairly stable land uses, and are not likely to impact the species in the foreseeable future.

3. Additional Information for State Department of Fish and Game

The data presented in the report concerning the Threatened status of the Flat-tailed Horned lizard appears well documented. The primary impacts and reasons for decline appear to be from habitat disruption; the report uses baseline data for the total amount of optimal habitat for the species identified in 1981 (854 square kilometers). The report indicates that 57% in of the optimal remaining habitat was impacted by human uses adverse to the species in 1981 while these impacts increased to 95% of the habitat by 1986. It appears that listing would not substantially effect any County operations or on-going maintenance activities.

If you have any questions about this memo, contact me or Michael Evans at 694-3733.

Ray Silver, Director
Department of Planning and Land Use

#88-165
RS/mue

United States Department of the Interior

BUREAU OF RECLAMATION
LOWER COLORADO REGIONAL OFFICE
P.O. BOX 427
BOULDER CITY, NEVADA 89005

IN REPLY
REFER TO:
LC-152A
ENV-4.0

OCT 16 1986

Ms. Betsy C. Bolster
Inland Fisheries Division
1701 Nimbus Road, Suite C
Rancho Cordova CA 95670

Subject: Review of Candidacy of the Flat-tailed Horned Lizard for Listing as an Endangered Species in California (Endangered Species)

Dear Ms. Bolster:

We have reviewed the petition to list the flat-tailed horned lizard as an endangered species in California and find no impact on Bureau of Reclamation activities. The document appears adequate for the purpose intended and no significant errors were noted.

We appreciate the opportunity to review the subject document.

Sincerely,

William E. Rinne

William E. Rinne
Regional Environmental Officer

cc: Director
California Department of Fish
and Game
1416 Ninth Street
Sacramento CA 95814

State of California

Memorandum

To : Betsy C. Bolster
Endangered Species Specialist
Inland Fisheries Division
Department of Fish and Game
1701 Nimbus Road, Suite C
Rancho Cordova, California 95670

Date : November 4, 1988

Place :

From : Department of Food and Agriculture
1220 N Street, P.O. Box 942871
Sacramento, California 94271-0001

Subject : Petition to List the Flat-Tailed Horned Lizard as an Endangered Species

The memorandum from Pete Bontadelli to Jack Parnell regarding the flat-tailed horned lizard (FTHL) has been referred to this office for reply. My staff have reviewed the petition to list FTHL and recommend the following comments be considered.

We are concerned about certain statements in the petition which refer to past and present pesticide use and specifically the Department of Food and Agriculture's (CDFA) use of malathion to control (vectors of) curly top virus as continuing threats to the FTHL. The petition states that FTHL is rarely active when its cloacal temperature is below 32°C (90°F). Malathion treatments are usually made in February when ambient temperatures do not favor FTHL activity. Therefore, the potential to affect FTHL is limited by lack of activity at the time of year when treatments are applied. The petition does not indicate what information the authors relied on to make their pesticide-related statements. The information available to us indicates that there is not likely to be a hazard to FTHL from malathion use to control curly top virus.

The statement that potential pesticide application areas include 76 percent of optimal FTHL range is deceiving because only a very small portion of the range is likely to be treated. The optimal range is defined as 854 square kilometers. Total treatment in all of Imperial County last year was less than three square kilometers. No treatments were made within several miles of the proposed preserve boundary areas.

CDFA cooperates with the Bureau of Land Management and abides by recommendations of the U.S. Fish and Wildlife Service to ensure that FTHL populations are not affected by malathion use to control curly top virus. Pretreatment surveys for FTHL activity and post-treatment surveys for prey survival are routinely conducted. Our observations indicate no impact on FTHL or its prey species. Our 1987 annual report is enclosed for your reference.

SURNAME

The FTHL range map indicates substantial continuity with the Mexican border and proximity to Arizona, but the petition makes no mention of FTHL populations in Mexico or Arizona. We support conservation efforts of FTHL but suggest that given the scarce resources available to protect truly endangered species, that you reserve judgment on endangered status for FTHL until survey data are more complete.

Thank you for the opportunity to comment on this matter.

Rex Magee

Rex Magee
Associate Director
(916) 322-6315

Enclosure

cc: Pete Bontadelli
Jack Parnell

IN REPLY REFER TO:

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
CALIFORNIA STATE OFFICE
2800 Cottage Way
Sacramento, California 95825

6840
(CA-932.5)

DEC 07 1988

Betsy C. Bolster
Inland Fisheries Division
California Department of Fish and Game
1701 Nimbus Road, Suite C
Rancho Cordova, CA 95670

Dear Ms. Bolster:

This is in response to Director Bontadelli's request for comments concerning the petition to list the flat-tailed horned lizard as an endangered species in California.

Attached are two memoranda which represent the Bureau of Land Management's (BLM) comments on the petition. One is from the Area Manager of the El Centro Resource Area who is responsible for most BLM decisions in the habitat of this species. The other is the Desert District Manager's endorsement of the Area Manager's comments.

If you have any questions, please contact the El Centro Area Manager or his staff directly, or contact Richard R. (Butch) Olendorff, BLM's State Office Endangered Species Coordinator, at (916) 978-4725.

Sincerely,

Acting Richard D. Roberts

Richard F. Johnson
Deputy State Director
Lands and Renewable Resources

Attachments
As Stated

cc: DM, CDD
AM, El Centro

Defenders
OF WILDLIFE

November 5, 1988

Ms. Betsy C. Bolster
Inland Fisheries Division
Department of Fish and Game
1701 Nimbus Road, Suite C
Rancho Cordova, CA 95670

Dear Ms. Bolster:

Defenders of Wildlife submits this letter to respond to Director Bontadelli's August 12 letter requesting our input on the petition to list the Flat-tailed Horned Lizard as an endangered species.

After reviewing this petition, we concur with the data provided, and we share the request of the petitioners that this species be promptly listed as endangered. Moreover, we believe that the petition provides persuasive documentation on the substantial and continuing threats to this species and its habitats.

We urge the Department to support this petition, and to recommend to the Commission that it approve the listing of this species as endangered.

Thank you very much for considering our views.

Sincerely,

Richard Spotts

Richard Spotts
California Representative
Defenders of Wildlife

RS/j.s

cc: Paul Kelly
W. W. Mayhew, Ph.D.
Barbara A. Carlson, M.A.

CALIFORNIA OFFICE: 5604 ROSEDALE WAY, SACRAMENTO, CALIFORNIA 95822 • (916) 442-6386
NATIONAL OFFICE: 1244 NINETEENTH STREET, NW • WASHINGTON, DC 20036 • (202) 659-9510

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
El Centro Resource Area
333 South Waterman
El Centro, California 92243

TAKE PRIDE IN AMERICA

IN REPLY REFER TO
6840
(CA-067.23)

October 27, 1988

MEMORANDUM

To : District Manager, California Desert (CA-063.14)

From : Area Manager, El Centro

Subject : Review of State Listing Petition for the Flat-tailed Horned Lizard

The El Centro Area Office has reviewed the subject petition. Overall, the petition correctly reflects trends in flat-tailed horned lizard (FTHL) relative abundance as determined through field monitoring in key habitat areas since 1984. However, we would like to clarify certain statements in the petition as well as update the information presented in several sections. Specific comments are presented below.

Section III. The petition states that designations as Federal candidate and BLM sensitive do little to prevent FTHL habitat destruction. It should be recognized that BLM is mandated by BLM Manual 6840 to "improve populations and habitats" of ... animals which are candidates for listing, proposed listed, or officially listed by the Federal government as being in potential danger of extinction (ie., threatened or endangered) to a point at which protection under the Endangered Species Act is no longer proposed or necessary. BLM is also directed "to manage the public lands so as to prevent deterioration of sensitive species' habitat, thereby precluding the need for State or Federal listing" (CSO IM CA-82-190). It should be recognized that, pursuant to these mandates, BLM has accorded the FTHL an exceptional level of consideration in making resource allocations. Mitigations for proposed geothermal development include relocation and minimization of facilities, route closures, employee education, and monitoring of FTHL status, plus compensation to be determined through interagency coordination. BLM has also prepared a management strategy document (now in draft) to standardize survey methods, habitat value determination, and mitigation and compensation strategy. The document has been prepared in close coordination with CDFG and USFWS. BLM is also proposing Desert Plan amendments to

change large portions of FTHL habitat from Class M to Class L.

The petition states that the cause of population declines is habitat destruction. This appears to be true in local situations in certain portions of at least the Yuha and East Mesa habitats. Other areas have suffered declines for which no obvious cause has been determined.

Section IV. The petition lists oil and gas leases as a threat. Oil and gas leases are quite unlikely to ever be developed. Leases per se are not impacting.

Re East Mesa, most existing sand and gravel permits occur in low or (primarily) no value FTHL habitat.

Re Ogilby South, it is unclear what area is referred to in the petition. No plans exist to put in developments at Ogilby as referred to in the Recreation Activity Management Plan (RAMP). If the area is actually Gray's Well, the RAMP was specifically modified to prohibit camping as a FTHL mitigation. Regardless, facilities will not determine the amount of visitor use; this is determined by OHV riding opportunities.

Re Superstition Mountain, the area has been designated as an ACEC. A route of travel approval process is currently being carried out, and a race course will be officially designated in the future to reduce OHV impacts.

Section V. Re near Ogilby and south ..., the Algodones Dunes HMP was finalized in 1987.

Re status in East Mesa, BLM conducted monitoring in 1987 and 1988. Data indicate that the trend was stable in 1987 in western East Mesa (the only portion studied in 1987). The trend in the same general area was stable to decreasing in 1988. Decreases in southeastern East Mesa are likely to continue due to habitat loss. Four additional sections of high, one section of medium, and two sections of low value habitat were defined in 1988.

Re Yuha Basin, overall decreases appear to have continued, based on monitoring in 1987 and 1988. Cross-country vehicle use by U.S. Border Patrol is an increasing impact.

Re Superstition Mountain, FTHL relative abundance appears stable overall, although some decreases occurred in 1987. Additional surveys in 1987 and 1988 have defined 10 sections of high, 5 sections of medium, and 10 sections of low FTHL relative abundance.

Habitat values are defined as:
High = > 9 scat observed/hour effort, or 1 lizard observed.
Medium = 5 to ≤ 9 scat observed/hour effort
Low = 1 to < 5 scat observed/hour effort
Poor/Unoccupied = < 1 scat observed/hour effort.

Section IX. The proposed Navy withdrawal was modified as reflected in Table 1 (attached). Alternative E was the final decision. Changes to Class L rather than Class I were based primarily on FTHL values.

Re Yuha Basin ACEC, the ACEC boundary expansion was approved. There has been no oil and gas or geothermal development.

Re East Mesa, oil and gas exploration and/or development is highly unlikely.

Table 1. The OHV use areas do not correspond to geographic identifiers used by BLM; it is therefore difficult to understand how 1986 values were calculated in relation to 1981 acreages. For example, East Mesa is not an open area - authorized or unauthorized. Neither is Yuha Basin. Superstition Mountain is now primarily Class L.

Reserves. Reserves are proposed in BLM's draft FTHL management strategy document. However, the boundaries proposed in the listing petition are unrealistic and do not take into consideration current resource allocations arrived at through extensive public input. The proposed Superstition Mountain reserve area, for example, includes a large portion of Class I area. East Mesa includes much of the existing geothermal field. Yuha includes areas well outside even historically crucial habitat defined in 1979. We do not support such broad-brushed delineations. Since reserves would be likely to preclude incompatible uses, careful consideration must be given to resources present as well as current resource allocations (both retrievable and irretrievable) before reserves are delineated.

This constitutes El Centro's comments on the petition. If you have any questions, please contact Lillian Andris-Olech at FTS 895-6616.

G. Ben Koski

TABLE 1

BLM/Navy Cooperative Agreement: Summary of Changes in Multiple Use Class and Vehicle Access Designations

	ALTERNATIVE				
	A	B	C	D	E
	Proposed Action	No Action	Maximum Use	Minimum Use	Multiple Resource
MULTIPLE USE CLASS CHANGES (Acres) - WEST SIDE					
Unclassified to I	27,780	0	48,260	8,000	13,290
Unclassified to L	40,740	0	20,260	60,520	56,110
M to L	3,920	0	3,920	4,710	3,920
M to I	1,120	0	1,120	330	1,120
I to L	500	0	0	500	500
I to Unclassified	1,280	0	1,280	1,280	1,280
M to Unclassified	1,540	0	1,540	1,540	1,540
VEHICLE ACCESS CHANGES (Acres) - WEST SIDE					
Undesignated to Limited	40,740	0	20,260	60,520	56,110
Open to Limited	500	0	0	500	500
Undesignated to Open	27,780	0	48,260	8,000	12,650
Open to Undesignated	1,280	0	1,280	1,280	1,280
Limited to Open	1,120	0	1,120	330	1,120
Limited to Undesignated	1,540	0	1,540	1,540	1,540
Withdrawn, managed as Open	240	0	1,320	70	1,320
MULTIPLE USE CLASS CHANGES (Acres) - EAST SIDE					
L to Unclassified	5,370	0	5,370	5,370	5,370
M to Unclassified	5,800	0	5,800	5,640	5,640
M to L	10,230	0	0	10,390	10,390
VEHICLE ACCESS CHANGES (Acres) - EAST SIDE					
Limited to Undesignated	9,400	0	9,400	9,240	9,240
Closed to Undesignated	1,760	0	1,760	1,760	1,760
Limited to Closed	10,230	0	0	10,360	10,360

White Buck

IN REPLY REFER TO:

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
CALIFORNIA STATE OFFICE
2800 Cottage Way
Sacramento, California 95825

AUG 30 1988

6840
(CA-930.5)

Memorandum

To: DM, CDD

From: Deputy State Director, Lands & Renewable Resources

Subject: Possible State Listing of the Flat-tailed Horned Lizard

Attached is a copy of a letter from the California Department of Fish and Game concerning a petition for listing the flat-tailed horned lizard as threatened or endangered. Because listing of this species could affect the management of thousands of acres of public lands, please review the petition closely. Send any comments you wish to make to CA-930 by November 1, 1988.

/s/ RICHARD E. JOHNSON

1 Attachment
1. As Stated

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

CALIFORNIA DESERT DISTRICT
1695 Spruce Street
Riverside, California 92507

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

IN REPLY REFER TO:
6840
(CA-063.14)

NOV 10 1988

Memorandum

To: State Director (CA-932.5)

From: District Manager, California Desert

Subject: Petition to State to List the Flat-tailed Horned Lizard

The petition to list the flat-tailed horned lizard was reviewed in detail in the El Centro Resource Area which contains most of the habitat for this species. Some remnant populations occur in the Coachella Valley of the Indio Resource Area. Specific comments on the petition are contained in the attached memorandum from the El Centro Area Manager. I concur in ~~most~~ THOSE comments, specifically in regards to the proposal on reserves. If such areas are established, they must be realistic and not be drawn to include incompatible uses already established and not likely movable, such as geothermal development.

Based on the large declines from historic distribution and the continuing declines in most areas, we believe a State listing as a threatened species is appropriate. It is our hope and intent that the flat-tailed horned lizard management strategy currently in preparation will lead to stabilization of populations in some areas. We have formed an Interagency Technical Advisory Committee to promote concern and coordination among several agencies (e.g., USFWS, CDFG, Bureau of Reclamation, Anza-Borrego Desert State Park, Univ. of Calif.).

Although we have received significant funding from the California Environmental License Plate Fund over the past few years for flat-tailed horned lizard habitat rehabilitation, a state-listing will assist in continued funding of plan implementation for the Bureau and other agencies. The state-listing will also strengthen mitigation authority on non-Bureau lands. We have been regularly seeking technical advice from the USFWS on projects impacting this species as a candidate for Federal listing; state-listing will necessitate consultation with the CDFG as well.

Edward E. Lin

Enclosure

Southern California Edison Company

P O BOX 800

2244 WALNUT GROVE AVENUE

ROSEMEAD, CALIFORNIA 91770

TELEPHONE
(818) 302-9465

WILLIAM R OSTRANDER
MANAGER OF
ENVIRONMENTAL SERVICES

February 17, 1989

Ms. Betsy C. Bolster
Inland Fisheries Division
California Department Of Fish and Game
1701 Nimbus Road, Suite C
Rancho Cordova, CA 95670

Dear Ms. Bolster:

Thank you for the opportunity to provide comment on the proposed listing of the flat-tailed horned lizard (Phrynosoma mcalli). Edison is neither for or against the listing at this time. Our comments focus on the effectiveness of the listing and the adequacy of the data to support listing at this time.

While most of this species' range is outside of Edison's current Service Territory, our biological staff has had experience with this species, particularly with the siting of new transmission lines and renewable and alternative energy resources like wind turbine machines and geothermal development. Our review of the data submitted in the petition to list raises important questions that we feel should be answered by the Department before a decision can be made on the appropriateness of listing this species. For example:

- How is listing going to change the Bureau of Land Management's (BLM) management of this species? Many of the activities cited as contributing to habitat losses for the FTHL seem to be occurring on public lands administered by the BLM and are, therefore, under their control. We are aware of the Memorandum that exists between the CDFG and the BLM concerning the treatment of listed species. However, it appears to us that since the BLM has listed the FTHL lizard as "Sensitive" for a number of years, and has done little to control activities adversely affecting FTHL habitat, little will be done by the BLM to change this regardless of the existing Memorandum.

- How will listing change those activities that appear to be beyond the control of either the BLM or state (e.g., ORV activity around Ogilby, pesticide spraying and drift, etc.)? Our concern is that the listing will be in name

only and that the burden for protecting this species will fall on those individuals or organizations that must apply to the state for some permit.

- Are more data needed to quantify population trends and habitat parameters prior to listing? The petition states that base line data showing population trends do not exist, and that the BLM has not been systematically collecting data on a yearly basis. Additionally, there does not appear to be a good delineation of habitat parameters for this species. While generally acknowledged to be a species associated with fine windblown sands, there are also indications that this species occurs on areas of cresote bush scrub with soils covered with pebbles or sand and gravel. Areas with these habitat parameters are widespread in the desert. Could it be that these areas have not been systematically searched and that the FTHL may be more abundant than currently thought?

Based on the above, Edison offers two recommendations to the Department: 1) the Department try to develop meaningful procedures for protecting this species on BLM-controlled lands so that listing is not necessary; and 2) better data to more accurately quantify suitable habitat, densities and population trends for this species should be developed. These data should better refine the degree of endangerment and the need for listing.

Once again, thank you for the opportunity to provide these comments ont the proposed listing. Should you have any questions concerning these comments, please feel free to call Mr. Dan Pearson, Senior Biologist, at (818) 302-9562.

Sincerely,

W. R. Ostrander

W. R. OStrander

pc: D. W. Stevens
D. C. Pearson

STATE OF CALIFORNIA—THE RESOURCES AGENCY

GEORGE DEUKMEJIAN, *Governor*

DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO 94296-0001
(916) 322-1967

MAR 0 3 1989

Betsy Bolster, Associate Fishery Biologist
Inland Fisheries Division
1701 Nimbus Road, Suite C
Rancho Cordova, CA 95670

Dear Ms. Bolster:

Thank you for your letter of February 24, 1989, soliciting my comments on the petition for the proposed listing of the flat-tailed horned lizard (FTHL) (Phrynosoma mcalli). To meet your deadline of March 10, 1989, I hereby submit the following comments:

1.) A land use map needs to be included in the Fish and Game staff report on the petition. This map should delineate current land use status with an overlay of FTHL habitat and population densities.

2.) A land use map should be included to depict expected land use status within ten years without listing, and with listing.

3.) How much habitat (in acres) is already protected in ACEC, WSA, wilderness, state park, BLM Class C, BLM Class L, and BLM Class M?

4.) Military lands need to be discussed further. For example, should military lands withdrawn for fly overs be considered as protected or reserved habitat if no surface impacts are occurring?

5.) Under private land use, if land is leased for oil or geothermal development does this automatically equate to a 100% surface disturbance? If not, what percentage of the surface is disturbed (2%)?

6.) How many FTHL are there in California approximately? Are there any in Mexico or elsewhere, and if so how many?

7.) The petitioner does not know how much land is needed for reserves? If this is so, then maybe already enough land is protected in the form of defacto reserves.

8.) How many acres of FTHL reserves are absolutely needed exactly or even approximately?

9.) If defacto reserves already exist, where are they, how large are they, and what is the condition of the FTHL populations within these?

10.) Agricultural spraying is mentioned as a threat, but the threat is not quantified. What is the rate of FTHL population decline directly attributed to spraying?

11.) If agricultural spaying is stopped, what would the impact of this be? Could there be uncertain secondary impacts to FTHL such as an increase in predators?

12.) "Intensive monitoring of FTHL trends indicates FTHL numbers are down in 3 of the 4 areas of high value for the lizard...". Compared to what and specifically how much? For the one area of high value, are the numbers stable or increasing, and specifically how much? How much area in acres was monitored?

13.) "Trend surveys have not been conducted in other areas of FTHL occurrance." How extensive are these areas? Specifically in acres. Are these viable populations? What is the population of FTHL in these areas. Could the species survive based on these populations alone?

14.) "Cause of the population decline is due to habitat destruction." What percentage the habitat is being destroyed per year, say for the next ten years? Is it less than 1%? What percentage of the habitat is already in some form of protected status? What factors will change this status? Specifically, how will listing reverse this in real terms that can be defined now?

15.) In general, Off-Highway Vehicles (OHV) routes are being closed more frequently than open, yet the unsubstantiated statement of an increase in the number of OHV routes continues to be made. An OHV is any motor vechicle that travels off the paved highway system and on gravel roads, dirt roads, volunteer trails, or primitive routes and ways. OHV management has improved significantly, better signing, more patrols, etc. Unsubstantiated statements regarding the extent of OHV routes on a habitat-wide basis need to be quantified and verified before they are accepted as part of the basis or justification for listing.

16.) How much additional land (in acres) will have to be closed and made into roadless wilderness where no development or use will be allowed (i.e. habitat reserves)? At who's expense will this be accomplished, and how much will this cost?

17.) If listing does not trigger some action or result in an expense, then what does it accomplish?

18.) Personal communications are used in the petition as references in several instances. How can these be considered to be consistantly accurate? Are these personal statements the best scientific information available?

19.) East Mesa threats are not quantified. General statements are made without directly substantiated data to support these assumptions. Ecological benefits of geothermal power versus nuclear or fossil fuel sources needs to be discussed. The assumption that ORV routes will proliferate, does not take into account current management practices, thus this assumption is very questionable. A map needs to be included to depict the extent of the area and the current land use status. FTHL population densities also need to be included.

20.) Yuha Basin threats are not quantified. General statements are made about habitat destruction by OHV use, but no specific surface impact data is given to substantiate the petitioners statements. A slight increase in FTHL population is sited in 1984, then a decrease in 1986. How much was the increase and how much was the decrease? A map needs to be included depicting the extent of the area, and current land use status. FTHL population densities need to also be included.

21.) Ogilby South threats are not quantified. Are sand dunes a considered FTHL habitat? Increased OHV use does not automatically equate with increased habitat loss. Assumptions are again made without considering improvements in OHV management techniques. A map needs to be included to depict the extent of the area, and the current land use status. FTHL population densities also need to be included.

22.) Kane Spring threats are not quantified. A map needs to be included to depict the extent of the area, and the current land use status. FTHL population densities also need to be included.

23.) Superstition Mountain threats are also not quantified. General statements are made without stating what is the current surface impact. A map needs to be included to depict the extent of the area, and the current land use status. FTHL population densities also need to be included.

24.) The Borrego Valley threat is not quantified. Monitoring showed a decrease compared to what? How extensive of an area was monitored? What type of controls were placed on monitoring to ensure that variables such as climatic conditions (both short term and long term) were taken into account? Are fluctuations of FTHL possible without the factor of OHV use involved, and if so, under what circumstances? Did the petitioner directly consult with the management of Ocotillo Wells SVRA to discuss their management practices? If not, why not? Is Fish and Game staff opposed to the expansion of Ocotillo Wells SVRA? The area is already being used legally for OHV recreation . State management of the expansion area should improve protective measure and reduce impacts. Since Fish and Game is aware of the proposed Ocotillo Wells SVRA expansion, what have the comments been to date?

25.) Based on the recent surveys, FTHL populations are stable or increasing in several locations. Can the overall population trends be accurately presented, based on only a few very recent surveys? In real numbers, what is the overall population trend?

26.) In some instances, the petitioner conjectures about the cause of population declines, in others, the cause of decline is said to be simply unknown. What is the cause of increased populations in some areas, and stable populations in others? Why is there no discussion about this? Could long-term prevailing natural forces be at work, that cannot be explained based on the few very recent surveys that only partially cover the habitat area? Are the mixture of ups and downs in FTHL populations mostly a natural phenomenon that can only be understood over an extended period of time? Yes, no, or perhaps maybe?

I look forward to Fish and Games staff's objective analysis (report) on this petition, so I may comment on it. This petition does not quantify the FTHL population, the current condition of the habitat, the amount of habitat currently in some form of protected status, the impact of listing as it relates to recovery rates and it does not provide a plan with

quantifiable goals. I suggest an accurate comprehensive report on the FTHL population and habitat status be prepared, and population recovery plan be included if this is determined to be needed. I do believe this petition is adequate. It relies too much on patchy data obtained on a sporadic basis. It presents a very incomplete assessment of habitat condition trends, and other variables such as climatic shifts. The basic claim of an unacceptable amount of habitat destruction is poorly supported by the petitions conjecture. This will become even more obvious when the actual measured percentage of surface impact is depicted in definable trends over time, and the current amount of already protected habitat is revealed.

I ask that copies of this letter be directly transmitted to each of the Fish and Game Commission members if it is possible to do so. I am sure other concerns will surface as the listing process proceeds, but this is the best I can do on such short notice. Please contact me at (916) 322-1967 if you have any questions.

Sincerely,

Lowell Landowski

Lowell Landowski
Land and Water Use Analyst
Off-Highway Motor Vehicle
Recreation Division

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IMPERIAL COUNTY

OFFICE OF
AGRICULTURAL COMMISSIONER
DIRECTOR OF WEIGHTS AND MEASURES
AIR POLLUTION CONTROL OFFICER

March 9, 1989

Betsy Bolster
Inland Fisheries Division
1701 Nimbus Road, Suite C
Rancho Cordova, CA 95670

Subject: Petition to list the Flat-Tailed Horned Lizard as endangered species

We have reviewed the petition to list the FTHL as an endangered species and submit these comments for consideration.

The petition cites several activities which are believed to be causing population decline of FTHL as a result of habitat destruction. I am extremely concerned by the statement that past and present pesticide use is contributing to the habitat destruction by means of destroying FTHL prey species.

In Section IV Nature and Degree of threat East Mesa, the petition reports that an indirect threat to FTHL may come from pesticide spraying and that FTHL habitat may receive drift from pesticides applied to agricultural fields that occur adjacent to their habitat. The petition does not address how this pesticide drift was determined to occur, how far into the habitat pesticide drifted and how often and how close the pesticide use occurred to the FTHL habitat. The petition does not provide data supporting the contention that pesticide use on agricultural fields is killing harvester ants, FTHL prey species. The vast majority of the FTHL habitat is of such distance from agricultural fields that pesticide spraying has not and will not adversely impact FTHL.

Pesticide use in Imperial County is strictly regulated by the Agricultural Commissioner. Permits for restricted materials use are issued only after mitigation measures are taken to prevent any adverse impacts to humans, animals, or the environment. The Commissioner also conducts pre-application site inspections to assure that pesticide use will conform to all permit conditions. The Commissioner maintains an active pesticide application monitoring program to check that applications are done with suitable equipment during climatic conditions that are proper to prevent drift and protect non target property.

The petition does not mention the status of the FTHL population in other areas of the southwest. According to Stebbins (1954), the FTHL habitat extends into northeastern Baja California, north western Sonora Mexico, and western Yuma County, Arizona. It appears that a more complete survey, including the above mentioned areas, is necessary to accurately determine FTHL populations and base your actions on that data.

In summary the petition has not provided data or information that supports its contention that pesticide use on agricultural fields has or will adversely impact FTHL and its habitat. This office does not support the listing of FTHL as an endangered species until it is conclusively proven that in fact, the FTHL population is in decline.

Sincerely,

Stephen L. Birdsall
Agricultural Commissioner

SLB/msb

NORMAN W. HICKEY
CHIEF ADMINISTRATIVE OFFICER
(619) 531-6226
(Location Code 730)

County of San Diego

CHIEF ADMINISTRATIVE OFFICE

1600 PACIFIC HIGHWAY, SAN DIEGO, CALIFORNIA 92101-2472

March 9, 1989

Betsy Bolster
Inland Fisheries Division
1701 Nimbus Road, Suite C
Rancho Cordova, CA 95670

Dear Ms. Bolster:

Thank you for sending me the information regarding the consideration of the flat-tailed horned lizard (Phrynosoma mcalli) as a candidate for listing as an endangered species in California.

If the flat-tailed horned lizard is declared an endangered species in the Borrego Valley habitat indicated on Figure 1, "Geographic range of Phrynosoma mcalli", I anticipate no impact on the agricultural industry in San Diego County. There are golf courses and commercial citrus plantings in the immediate vicinity of Borrego. However, these have been there for several years. The only potato planting in the area is located in acreage formerly planted to grapes.

If you need any further information, please feel free to contact me.

Sincerely,

Kathleen A. Thuner

KATHLEEN A. THUNER
Agricultural Commissioner/
Sealer of Weights and Measures

KAT:it